SEQUENCE LISTING

<110> CALIFORNIA INSTITUTE OF TECHNOLOGY
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<120> POLYCYSTIC KIDNEY DISEASE GENE HOMOLOGS REQUIRED FOR MALE MATING
BEHAVIOR IN NEMATODES AND ASSAYS BASED THEREON

<130> CIT1520-2

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<210> 1
<211> 12912
<212> DNA
<213> Homo sapiens PKD-1 gene

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ctg tgg ctc ggg gcg ctg gcg ggg ggg ccc ggg cgc ggc tgc ggg ccc      96
Leu Trp Leu Gly Ala Leu Ala Gly Gly Pro Gly Arg Gly Cys Gly Pro
                20                  25                  30

tgc gag ccc ccc tgc ctc tgc ggg cca gcg ccc ggc gcc gcc tgc cgc     144
Cys Glu Pro Pro Cys Leu Cys Gly Pro Ala Pro Gly Ala Ala Cys Arg
            35                  40                  45

gtc aac tgc tcg ggc cgc ggg ctg cgg acg ctc ggt ccc gcg ctg cgc     192
Val Asn Cys Ser Gly Arg Gly Leu Arg Thr Leu Gly Pro Ala Leu Arg
        50                  55                  60

atc ccc gcg gac gcc aca gag cta gac gtc tcc cac aac ctg ctc cgg     240
Ile Pro Ala Asp Ala Thr Glu Leu Asp Val Ser His Asn Leu Leu Arg
65                  70                  75                  80

gcg ctg gac gtt ggg ctc ctg gcg aac ctc tcg gcg ctg gca gag ctg     288
Ala Leu Asp Val Gly Leu Leu Ala Asn Leu Ser Ala Leu Ala Glu Leu
                85                  90                  95

gat ata agc aac aac aag att tct acg tta gaa gaa gga ata ttt gct     336
Asp Ile Ser Asn Asn Lys Ile Ser Thr Leu Glu Glu Gly Ile Phe Ala
                100                 105                 110
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aat tta ttt aat tta agt gaa ata aac ctg agt ggg aac ccg ttt gag       384
Asn Leu Phe Asn Leu Ser Glu Ile Asn Leu Ser Gly Asn Pro Phe Glu
        115             120             125

tgt gac tgt ggc ctg gcg tgg ctg ccg caa tgg gcg gag gag cag cag       432
Cys Asp Cys Gly Leu Ala Trp Leu Pro Gln Trp Ala Glu Glu Gln Gln
        130             135             140

gtg cgg gtg gtg cag ccc gag gca gcc acg tgt gct ggg cct ggc tcc       480
Val Arg Val Val Gln Pro Glu Ala Ala Thr Cys Ala Gly Pro Gly Ser
145             150             155             160

ctg gct ggc cag cct ctg ctt ggc atc ccc ttg ctg gac agt ggc tgt       528
Leu Ala Gly Gln Pro Leu Leu Gly Ile Pro Leu Leu Asp Ser Gly Cys
                165             170             175

ggt gag gag tat gtc gcc tgc ctc cct gac aac agc tca ggc acc gtg       576
Gly Glu Glu Tyr Val Ala Cys Leu Pro Asp Asn Ser Ser Gly Thr Val
            180             185             190

gca gca gtg tcc ttt tca gct gcc cac gaa ggc ctg ctt cag cca gag       624
Ala Ala Val Ser Phe Ser Ala Ala His Glu Gly Leu Leu Gln Pro Glu
            195             200             205

gcc tgc agc gcc ttc tgc ttc tcc acc ggc cag ggc ctc gca gcc ctc       672
Ala Cys Ser Ala Phe Cys Phe Ser Thr Gly Gln Gly Leu Ala Ala Leu
        210             215             220

tcg gag cag ggc tgg tgc ctg tgt ggg gcg gcc cag ccc tcc agt gcc       720
Ser Glu Gln Gly Trp Cys Leu Cys Gly Ala Ala Gln Pro Ser Ser Ala
225             230             235             240

tcc ttt gcc tgc ctg tcc ctc tgc tcc ggg ccc ccg gca cct cct gcc       768
Ser Phe Ala Cys Leu Ser Leu Cys Ser Gly Pro Pro Ala Pro Pro Ala
                245             250             255

ccc acc tgt agg ggc ccc acc ctc ctc cag cac gtc ttc cct gcc tcc       816
Pro Thr Cys Arg Gly Pro Thr Leu Leu Gln His Val Phe Pro Ala Ser
            260             265             270

cca ggg gcc acc ctg gtg ggg ccc cac gga cct ctg gcc tct ggc cag       864
Pro Gly Ala Thr Leu Val Gly Pro His Gly Pro Leu Ala Ser Gly Gln
            275             280             285

cta gca gcc ttc cac atc gct gcc ccg ctc cct gtc act gac aca cgc       912
Leu Ala Ala Phe His Ile Ala Ala Pro Leu Pro Val Thr Asp Thr Arg
            290             295             300

tgg gac ttc gga gac ggc tcc gcc gag gtg gat gcc gct ggg ccg gct       960
Trp Asp Phe Gly Asp Gly Ser Ala Glu Val Asp Ala Ala Gly Pro Ala
305             310             315             320

gcc tcg cat cgc tat gtg ctg cct ggg cgc tat cac gtg acg gcc gtg      1008
Ala Ser His Arg Tyr Val Leu Pro Gly Arg Tyr His Val Thr Ala Val
            325             330             335

ctg gcc ctg ggg gcc ggc tca gcc ctg ctg ggg aca gac gtg cag gtg      1056
Leu Ala Leu Gly Ala Gly Ser Ala Leu Leu Gly Thr Asp Val Gln Val
            340             345             350
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gaa gcg gca cct gcc gcc ctg gag ctc gtg tgc ccg tcc tcg gtg cag    1104
Glu Ala Ala Pro Ala Ala Leu Glu Leu Val Cys Pro Ser Ser Val Gln
        355             360             365

agt gac gag agc ctc gac ctc agc atc cag aac cgc ggt ggt tca ggc    1152
Ser Asp Glu Ser Leu Asp Leu Ser Ile Gln Asn Arg Gly Gly Ser Gly
        370             375             380

ctg gag gcc gcc tac agc atc gtg gcc ctg ggc gag gag ccg gcc cga    1200
Leu Glu Ala Ala Tyr Ser Ile Val Ala Leu Gly Glu Glu Pro Ala Arg
385             390             395             400

gcg gtg cac ccg ctc tgc ccc tcg gac acg gag atc ttc cct ggc aac    1248
Ala Val His Pro Leu Cys Pro Ser Asp Thr Glu Ile Phe Pro Gly Asn
            405             410             415

ggg cac tgc tac cgc ctg gtg gtg gag aag gcg gcc tgg ctg cag gcg    1296
Gly His Cys Tyr Arg Leu Val Val Glu Lys Ala Ala Trp Leu Gln Ala
            420             425             430

cag gag cag tgt cag gcc tgg gcc ggg gcc gcc ctg gca atg gtg gac    1344
Gln Glu Gln Cys Gln Ala Trp Ala Gly Ala Ala Leu Ala Met Val Asp
        435             440             445

agt ccc gcc gtg cag cgc ttc ctg gtc tcc cgg gtc acc agg agc cta    1392
Ser Pro Ala Val Gln Arg Phe Leu Val Ser Arg Val Thr Arg Ser Leu
        450             455             460

gac gtg tgg atc ggc ttc tcg act gtg cag ggg gtg gag gtg ggc cca    1440
Asp Val Trp Ile Gly Phe Ser Thr Val Gln Gly Val Glu Val Gly Pro
465             470             475             480

gcg ccg cag ggc gag gcc ttc agc ctg gag agc tgc cag aac tgg ctg    1488
Ala Pro Gln Gly Glu Ala Phe Ser Leu Glu Ser Cys Gln Asn Trp Leu
            485             490             495

ccc ggg gag cca cac cca gcc aca gcc gag cac tgc gtc cgg ctc ggg    1536
Pro Gly Glu Pro His Pro Ala Thr Ala Glu His Cys Val Arg Leu Gly
        500             505             510

ccc acc ggg tgg tgt aac acc gac ctg tgc tca gcg ccg cac agc tac    1584
Pro Thr Gly Trp Cys Asn Thr Asp Leu Cys Ser Ala Pro His Ser Tyr
        515             520             525

gtc tgc gag ctg cag ccc gga ggc cca gtg cag gat gcc gag aac ctc    1632
Val Cys Glu Leu Gln Pro Gly Gly Pro Val Gln Asp Ala Glu Asn Leu
        530             535             540

ctc gtg gga gcg ccc agt ggg gac ctg cag gga ccc ctg acg cct ctg    1680
Leu Val Gly Ala Pro Ser Gly Asp Leu Gln Gly Pro Leu Thr Pro Leu
545             550             555             560

gca cag cag gac ggc ctc tca gcc ccg cac gag ccc gtg gag gtc atg    1728
Ala Gln Gln Asp Gly Leu Ser Ala Pro His Glu Pro Val Glu Val Met
            565             570             575

gta ttc ccg ggc ctg cgt ctg agc cgt gaa gcc ttc ctc acc acg gcc    1776
Val Phe Pro Gly Leu Arg Leu Ser Arg Glu Ala Phe Leu Thr Thr Ala
            580             585             590

gaa ttt ggg acc cag gag ctc cgg cgg ccc gcc cag ctg cgg ctg cag    1824
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            Glu Phe Gly Thr Gln Glu Leu Arg Arg Pro Ala Gln Leu Arg Leu Gln
                595                 600                 605


gtg tac cgg ctc ctc agc aca gca ggg acc ccg gag aac ggc agc gag      1872
Val Tyr Arg Leu Leu Ser Thr Ala Gly Thr Pro Glu Asn Gly Ser Glu
    610                 615                 620


cct gag agc agg tcc ccg gac aac agg acc cag ctg gcc ccc gcg tgc      1920
Pro Glu Ser Arg Ser Pro Asp Asn Arg Thr Gln Leu Ala Pro Ala Cys
625                 630                 635                 640


atg cca ggg gga cgc tgg tgc cct gga gcc aac atc tgc ttg ccg ctg      1968
Met Pro Gly Gly Arg Trp Cys Pro Gly Ala Asn Ile Cys Leu Pro Leu
                645                 650                 655


gac gcc tcc tgc cac ccc cag gcc tgc gcc aat ggc tgc acg tca ggg      2016
Asp Ala Ser Cys His Pro Gln Ala Cys Ala Asn Gly Cys Thr Ser Gly
                560                 565                 670


cca ggg cta ccc ggg gcc ccc tat gcg cta tgg aga gag ttc ctc ttc      2064
Pro Gly Leu Pro Gly Ala Pro Tyr Ala Leu Trp Arg Glu Phe Leu Phe
                675                 680                 685


tcc gtt ccc gcg ggg ccc ccc gcg cag tac tcg gtc acc ctc cac ggc      2112
Ser Val Pro Ala Gly Pro Pro Ala Gln Tyr Ser Val Thr Leu His Gly
                690                 695                 700


cag gat gtc ctc atg ctc cct ggt gac ctc gtt ggc ttg cag cac gac      2160
Gln Asp Val Leu Met Leu Pro Gly Asp Leu Val Gly Leu Gln His Asp
705                 710                 715                 720


gct ggc cct ggc gcc ctc ctg cac tgc tcg ccg gct ccc ggc cac cct      2208
Ala Gly Pro Gly Ala Leu Leu His Cys Ser Pro Ala Pro Gly His Pro
                725                 730                 735


ggt ccc cgg gcc ccg tac ctc tcc gcc aac gcc tcg tca tgg ctg ccc      2256
Gly Pro Arg Ala Pro Tyr Leu Ser Ala Asn Ala Ser Ser Trp Leu Pro
                740                 745                 750


cac ttg cca gcc cag ctg gag ggc act tgg ggc tgc cct gcc tgt gcc      2304
His Leu Pro Ala Gln Leu Glu Gly Thr Trp Gly Cys Pro Ala Cys Ala
                755                 760                 765


ctg cgg ctg ctt gca caa cgg gaa cag ctc acc gtg ctg ctg ggc ttg      2352
Leu Arg Leu Leu Ala Gln Arg Glu Gln Leu Thr Val Leu Leu Gly Leu
                770                 775                 780


agg ccc aac cct gga ctg cgg ctg cct ggg cgc tat gag gtc cgg gca      2400
Arg Pro Asn Pro Gly Leu Arg Leu Pro Gly Arg Tyr Glu Val Arg Ala
785                 790                 795                 800


gag gtg ggc aat ggc gtg tcc agg cac aac ctc tcc tgc agc ttt gac      2448
Glu Val Gly Asn Gly Val Ser Arg His Asn Leu Ser Cys Ser Phe Asp
                805                 810                 815


gtg gtc tcc cca gtg gct ggg ctg cgg gtc atc tac cct gcc ccc cgc      2496
Val Val Ser Pro Val Ala Gly Leu Arg Val Ile Tyr Pro Ala Pro Arg
                820                 825                 830


gac ggc cgc ctc tac gtg ccc acc aac ggc tca gcc ttg gtg ctc cag      2544
Asp Gly Arg Leu Tyr Val Pro Thr Asn Gly Ser Ala Leu Val Leu Gln
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              835                    840                    845

gtg gac tct ggt gcc aac gcc acg gcc acg gct cgc tgg cct ggg ggc      2592
Val Asp Ser Gly Ala Asn Ala Thr Ala Thr Ala Arg Trp Pro Gly Gly
    850                 855                 860

agt ctc agc gcc cgc ttt gag aat gtc tgc cct gcc ctg gtg gcc acc      2640
Ser Leu Ser Ala Arg Phe Glu Asn Val Cys Pro Ala Leu Val Ala Thr
865                 870                 875                 880

ttc gtg ccc gcc tgc ccc tgg gag acc aac gat acc ctg ttc tca gtg      2688
Phe Val Pro Ala Cys Pro Trp Glu Thr Asn Asp Thr Leu Phe Ser Val
                885                 890                 895

gta gca ctg ccg tgg ctc agt gag ggg gag cac gtg gtg gac gtg gtg      2736
Val Ala Leu Pro Trp Leu Ser Glu Gly Glu His Val Val Asp Val Val
                900                 905                 910

gtg gaa aac agc gcc agc cgg gcc aac ctc agc ctg cgg gtg acg gcg      2784
Val Glu Asn Ser Ala Ser Arg Ala Asn Leu Ser Leu Arg Val Thr Ala
                915                 920                 925

gag gag ccc atc tgt ggc ctc cgc gcc acg ccc agc ccc gag gcc cgt      2832
Glu Glu Pro Ile Cys Gly Leu Arg Ala Thr Pro Ser Pro Glu Ala Arg
    930                 935                 940

gta ctg cag gga gtc cta gtg agg tac agc ccc gtg gtg gag gcc ggc      2880
Val Leu Gln Gly Val Leu Val Arg Tyr Ser Pro Val Val Glu Ala Gly
945                 950                 955                 960

tcg gac atg gtc ttc cgg tgg acc atc aac gac aag cag tcc ctg acc      2928
Ser Asp Met Val Phe Arg Trp Thr Ile Asn Asp Lys Gln Ser Leu Thr
                965                 970                 975

ttc cag aac gtg gtc ttc aat gtc att tat cag agc gcg gcg gtc ttc      2976
Phe Gln Asn Val Val Phe Asn Val Ile Tyr Gln Ser Ala Ala Val Phe
                980                 985                 990

aag ctc tca ctg acg gcc tcc aac  cac gtg agc aac gtc  acc gtg aac    3024
Lys Leu Ser Leu Thr Ala Ser Asn  His Val Ser Asn Val  Thr Val Asn
                995                 1000                1005

tac aac  gta acc gtg gag cgg  atg aac agg atg cag  ggt ctg cag       3069
Tyr Asn  Val Thr Val Glu Arg  Met Asn Arg Met Gln  Gly Leu Gln
    1010                1015                1020

gtc tcc  aca gtg ccg gcc gtg  ctg tcc ccc aat gcc  acg cta gca       3114
Val Ser  Thr Val Pro Ala Val  Leu Ser Pro Asn Ala  Thr Leu Ala
    1025                1030                1035

ctg acg  gcg ggc gtg ctg gtg  gac tcg gcc gtg gag  gtg gcc ttc       3159
Leu Thr  Ala Gly Val Leu Val  Asp Ser Ala Val Glu  Val Ala Phe
    1040                1045                1050

ctg tgg  acc ttt ggg gat ggg  gag cag gcc ctc cac  cag ttc cag       3204
Leu Trp  Thr Phe Gly Asp Gly  Glu Gln Ala Leu His  Gln Phe Gln
    1055                1060                1065

cct ccg  tac aac gag tcc ttc  cca gtt cca gac ccc  tcg gtg gcc       3249
Pro Pro  Tyr Asn Glu Ser Phe  Pro Val Pro Asp Pro  Ser Val Ala
    1070                1075                1080
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cag gtg ctg gtg gag cac aat  gtc acg cac acc tac  gct gcc cca      3294
Gln Val Leu Val Glu His Asn  Val Thr His Thr Tyr  Ala Ala Pro
    1085            1090              1095

ggt gag tac ctc ctg acc gtg  ctg gca tct aat gcc  ttc gag aac      3339
Gly Glu Tyr Leu Leu Thr Val  Leu Ala Ser Asn Ala  Phe Glu Asn
    1100            1105              1110

ctg acg cag cag gtg cct gtg  agc gtg cgc gcc tcc  ctg ccc tcc      3384
Leu Thr Gln Gln Val Pro Val  Ser Val Arg Ala Ser  Leu Pro Ser
    1115            1120              1125

gtg gct gtg ggt gtg agt gac  ggc gtc ctg gtg gcc  ggc cgg ccc      3429
Val Ala Val Gly Val Ser Asp  Gly Val Leu Val Ala  Gly Arg Pro
    1130            1135              1140

gtc acc ttc tac ccg cac ccg  ctg ccc tcg cct ggg  ggt gtt ctt      3474
Val Thr Phe Tyr Pro His Pro  Leu Pro Ser Pro Gly  Gly Val Leu
    1145            1150              1155

tac acg tgg gac ttc ggg gac  ggc tcc cct gtc ctg  acc cag agc      3519
Tyr Thr Trp Asp Phe Gly Asp  Gly Ser Pro Val Leu  Thr Gln Ser
    1160            1165              1170

cag ccg gct gcc aac cac acc  tat gcc tcg agg ggc  acc tac cac      3564
Gln Pro Ala Ala Asn His Thr  Tyr Ala Ser Arg Gly  Thr Tyr His
    1175            1180              1185

gtg cgc ctg gag gtc aac aac  acg gtg agc ggt gcg  gcg gcc cag      3609
Val Arg Leu Glu Val Asn Asn  Thr Val Ser Gly Ala  Ala Ala Gln
    1190            1195              1200

gcg gat gtg cgc gtc ttt gag  gag ctc cgc gga ctc  agc gtg gac      3654
Ala Asp Val Arg Val Phe Glu  Glu Leu Arg Gly Leu  Ser Val Asp
    1205            1210              1215

atg agc ctg gcc gtg gag cag  ggc gcc ccc gtg gtg  gtc agc gcc      3699
Met Ser Leu Ala Val Glu Gln  Gly Ala Pro Val Val  Val Ser Ala
    1220            1225              1230

gcg gtg cag acg ggc gac aac  atc acg tgg acc ttc  gac atg ggg      3744
Ala Val Gln Thr Gly Asp Asn  Ile Thr Trp Thr Phe  Asp Met Gly
    1235            1240              1245

gac ggc acc gtg ctg tcg ggc  ccg gag gca aca gtg  gag cat gtg      3789
Asp Gly Thr Val Leu Ser Gly  Pro Glu Ala Thr Val  Glu His Val
    1250            1255              1260

tac ctg cgg gca cag aac tgc  aca gtg acc gtg ggt  gcg ggc agc      3834
Tyr Leu Arg Ala Gln Asn Cys  Thr Val Thr Val Gly  Ala Gly Ser
    1265            1270              1275

ccc gcc ggc cac ctg gcc cgg  agc ctg cac gtg ctg  gtc ttc gtc      3879
Pro Ala Gly His Leu Ala Arg  Ser Leu His Val Leu  Val Phe Val
    1280            1285              1290

ctg gag gtg ctg cgc gtt gaa  ccc gcc gcc tgc atc  ccc acg cag      3924
Leu Glu Val Leu Arg Val Glu  Pro Ala Ala Cys Ile  Pro Thr Gln
    1295            1300              1305
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cct gac  gcg cgg ctc acg gcc  tac gtc acc ggg aac  ccg gcc cac      3969
Pro Asp  Ala Arg Leu Thr Ala  Tyr Val Thr Gly Asn  Pro Ala His
    1310             1315               1320

tac ctc  ttc gac tgg acc ttc  ggg gat ggc tcc tcc  aac acg acc      4014
Tyr Leu  Phe Asp Trp Thr Phe  Gly Asp Gly Ser Ser  Asn Thr Thr
    1325             1330               1335

gtg cgg  ggg tgc ccg acg gtg  aca cac aac ttc acg  cgg agc ggc      4059
Val Arg  Gly Cys Pro Thr Val  Thr His Asn Phe Thr  Arg Ser Gly
    1340             1345               1350

acg ttc  ccc ctg gcg ctg gtg  ctg tcc agc cgc gtg  aac agg gcg      4104
Thr Phe  Pro Leu Ala Leu Val  Leu Ser Ser Arg Val  Asn Arg Ala
    1355             1360               1365

cat tac  ttc acc agc atc tgc  gtg gag cca gag gtg  ggc aac gtc      4149
His Tyr  Phe Thr Ser Ile Cys  Val Glu Pro Glu Val  Gly Asn Val
    1370             1375               1380

acc ctg  cag cca gag agg cag  ttt gtg cag ctc ggg  gac gag gcc      4194
Thr Leu  Gln Pro Glu Arg Gln  Phe Val Gln Leu Gly  Asp Glu Ala
    1385             1390               1395

tgg ctg  gtg gca tgt gcc tgg  ccc ccg ttc ccc tac  cgc tac acc      4239
Trp Leu  Val Ala Cys Ala Trp  Pro Pro Phe Pro Tyr  Arg Tyr Thr
    1400             1405               1410

tgg gac  ttt ggc acc gag gaa  gcc gcc ccc acc cgt  gcc agg ggc      4284
Trp Asp  Phe Gly Thr Glu Glu  Ala Ala Pro Thr Arg  Ala Arg Gly
    1415             1420               1425

cct gag  gtg acg ttc atc tac  cga gac cca ggc tcc  tat ctt gtg      4329
Pro Glu  Val Thr Phe Ile Tyr  Arg Asp Pro Gly Ser  Tyr Leu Val
    1430             1435               1440

aca gtc  acc gcg tcc aac aac  atc tct gct gcc aat  gac tca gcc      4374
Thr Val  Thr Ala Ser Asn Asn  Ile Ser Ala Ala Asn  Asp Ser Ala
    1445             1450               1455

ctg gtg  gag gtg cag gag ccc  gtg ctg gtc acc agc  atc aag gtc      4419
Leu Val  Glu Val Gln Glu Pro  Val Leu Val Thr Ser  Ile Lys Val
    1460             1465               1470

aat ggc  tcc ctt ggg ctg gag  ctg cag cag ccg tac  ctg ttc tct      4464
Asn Gly  Ser Leu Gly Leu Glu  Leu Gln Gln Pro Tyr  Leu Phe Ser
    1475             1480               1485

gct gtg  ggc cgt ggg cgc ccc  gcc agc tac ctg tgg  gat ctg ggg      4509
Ala Val  Gly Arg Gly Arg Pro  Ala Ser Tyr Leu Trp  Asp Leu Gly
    1490             1495               1500

gac ggt  ggg tgg ctc gag ggt  ccg gag gtc acc cac  gct tac aac      4554
Asp Gly  Gly Trp Leu Glu Gly  Pro Glu Val Thr His  Ala Tyr Asn
    1505             1510               1515

agc aca  ggt gac ttc acc gtt  agg gtg gcc ggc tgg  aat gag gtg      4599
Ser Thr  Gly Asp Phe Thr Val  Arg Val Ala Gly Trp  Asn Glu Val
    1520             1525               1530

agc cgc  agc gag gcc tgg ctc  aat gtg acg gtg aag  cgg cgc gtg      4644
```

```
    Ser Arg  Ser Glu Ala Trp Leu  Asn Val Thr Val Lys  Arg Arg Val
        1535              1540              1545
```

```
    cgg ggg  ctc gtc gtc aat gca  agc cgc acg gtg gtg  ccc ctg aat      4689
    Arg Gly  Leu Val Val Asn Ala  Ser Arg Thr Val Val  Pro Leu Asn
        1550              1555              1560
```

```
    ggg agc  gtg agc ttc agc acg  tcg ctg gag gcc ggc  agt gat gtg      4734
    Gly Ser  Val Ser Phe Ser Thr  Ser Leu Glu Ala Gly  Ser Asp Val
        1565              1570              1575
```

```
    cgc tat  tcc tgg gtg ctc tgt  gac cgc tgc acg ccc  atc cct ggg      4779
    Arg Tyr  Ser Trp Val Leu Cys  Asp Arg Cys Thr Pro  Ile Pro Gly
        1580              1585              1590
```

```
    ggt cct  acc atc tct tac acc  ttc cgc tcc gtg ggc  acc ttc aat      4824
    Gly Pro  Thr Ile Ser Tyr Thr  Phe Arg Ser Val Gly  Thr Phe Asn
        1595              1600              1605
```

```
    atc atc  gtc acg gct gag aac  gag gtg ggc tcc gcc  cag gac agc      4869
    Ile Ile  Val Thr Ala Glu Asn  Glu Val Gly Ser Ala  Gln Asp Ser
        1610              1615              1620
```

```
    atc ttc  gtc tat gtc ctg cag  ctc ata gag ggg ctg  cag gtg gtg      4914
    Ile Phe  Val Tyr Val Leu Gln  Leu Ile Glu Gly Leu  Gln Val Val
        1625              1630              1635
```

```
    ggc ggt  ggc cgc tac ttc ccc  acc aac cac acg gta  cag ctg cag      4959
    Gly Gly  Gly Arg Tyr Phe Pro  Thr Asn His Thr Val  Gln Leu Gln
        1640              1645              1650
```

```
    gcc gtg  gtt agg gat ggc acc  aac gtc tcc tac agc  tgg act gcc      5004
    Ala Val  Val Arg Asp Gly Thr  Asn Val Ser Tyr Ser  Trp Thr Ala
        1655              1660              1665
```

```
    tgg agg  gac agg ggc ccg gcc  ctg gcc ggc agc ggc  aaa ggc ttc      5049
    Trp Arg  Asp Arg Gly Pro Ala  Leu Ala Gly Ser Gly  Lys Gly Phe
        1670              1675              1680
```

```
    tcg ctc  acc gtg ctc gag gcc  ggc acc tac cat gtg  cag ctg cgg      5094
    Ser Leu  Thr Val Leu Glu Ala  Gly Thr Tyr His Val  Gln Leu Arg
        1685              1690              1695
```

```
    gcc acc  aac atg ctg ggc agc  gcc tgg gcc gac tgc  acc atg gac      5139
    Ala Thr  Asn Met Leu Gly Ser  Ala Trp Ala Asp Cys  Thr Met Asp
        1700              1705              1710
```

```
    ttc gtg  gag cct gtg ggg tgg  ctg atg gtg gcc gcc  tcc ccg aac      5184
    Phe Val  Glu Pro Val Gly Trp  Leu Met Val Ala Ala  Ser Pro Asn
        1715              1720              1725
```

```
    cca gct  gcc gtc aac aca agc  gtc acc ctc agt gcc  gag ctg gct      5229
    Pro Ala  Ala Val Asn Thr Ser  Val Thr Leu Ser Ala  Glu Leu Ala
        1730              1735              1740
```

```
    ggt ggc  agt ggt gtc gta tac  act tgg tcc ttg gag  gag ggg ctg      5274
    Gly Gly  Ser Gly Val Val Tyr  Thr Trp Ser Leu Glu  Glu Gly Leu
        1745              1750              1755
```

```
    agc tgg  gag acc tcc gag cca  ttt acc acc cat agc  ttc ccc aca      5319
    Ser Trp  Glu Thr Ser Glu Pro  Phe Thr Thr His Ser  Phe Pro Thr
```

```
            1760                         1765                         1770

ccc ggc  ctg cac ttg gtc acc  atg acg gca ggg aac  ccg ctg ggc          5364
Pro Gly  Leu His Leu Val Thr  Met Thr Ala Gly Asn  Pro Leu Gly
         1775                         1780                         1785

tca gcc  aac gcc acc gtg gaa  gtg gat gtg cag gtg  cct gtg agt          5409
Ser Ala  Asn Ala Thr Val Glu  Val Asp Val Gln Val  Pro Val Ser
         1790                         1795                         1800

ggc ctc  agc atc agg gcc agc  gag ccc gga ggc agc  ttc gtg gcg          5454
Gly Leu  Ser Ile Arg Ala Ser  Glu Pro Gly Gly Ser  Phe Val Ala
         1805                         1810                         1815

gcc ggg  tcc tct gtg ccc ttt  tgg ggg cag ctg gcc  acg ggc acc          5499
Ala Gly  Ser Ser Val Pro Phe  Trp Gly Gln Leu Ala  Thr Gly Thr
         1820                         1825                         1830

aat gtg  agc tgg tgc tgg gct  gtg ccc ggc ggc agc  agc aag cgt          5544
Asn Val  Ser Trp Cys Trp Ala  Val Pro Gly Gly Ser  Ser Lys Arg
         1835                         1840                         1845

ggc cct  cat gtc acc atg gtc  ttc ccg gat gct ggc  acc ttc tcc          5589
Gly Pro  His Val Thr Met Val  Phe Pro Asp Ala Gly  Thr Phe Ser
         1850                         1855                         1860

atc cgg  ctc aat gcc tcc aac  gca gtc agc tgg gtc  tca gcc acg          5634
Ile Arg  Leu Asn Ala Ser Asn  Ala Val Ser Trp Val  Ser Ala Thr
         1865                         1870                         1875

tac aac  ctc acg gcg gag gag  ccc atc gtg ggc ctg  gtg ctg tgg          5679
Tyr Asn  Leu Thr Ala Glu Glu  Pro Ile Val Gly Leu  Val Leu Trp
         1890                         1885                         1890

gcc agc  agc aag gtg gtg gcg  ccc ggg cag ctg gtc  cat ttt cag          5724
Ala Ser  Ser Lys Val Val Ala  Pro Gly Gln Leu Val  His Phe Gln
         1895                         1900                         1905

atc ctg  ctg gct gcc ggc tca  gct gtc acc ttc cgc  cta cag gtc          5769
Ile Leu  Leu Ala Ala Gly Ser  Ala Val Thr Phe Arg  Leu Gln Val
         1910                         1915                         1920

ggc ggg  gcc aac ccc gag gtg  ctc ccc ggg ccc cgt  ttc tcc cac          5814
Gly Gly  Ala Asn Pro Glu Val  Leu Pro Gly Pro Arg  Phe Ser His
         1925                         1930                         1935

agc ttc  ccc cgc gtc gga gac  cac gtg gtg agc gtg  cgg ggc aaa          5859
Ser Phe  Pro Arg Val Gly Asp  His Val Val Ser Val  Arg Gly Lys
         1940                         1945                         1950

aac cac  gtg agc tgg gcc cag  gcg cag gtg cgc atc  gtg gtg ctg          5904
Asn His  Val Ser Trp Ala Gln  Ala Gln Val Arg Ile  Val Val Leu
         1955                         1960                         1965

gag gcc  gtg agt ggg ctg cag  gtg ccc aac tgc tgc  gag cct ggc          5949
Glu Ala  Val Ser Gly Leu Gln  Val Pro Asn Cys Cys  Glu Pro Gly
         1970                         1975                         1980

atc gcc  acg ggc act gag agg  aac ttc aca gcc cgc  gtg cag cgc          5994
Ile Ala  Thr Gly Thr Glu Arg  Asn Phe Thr Ala Arg  Val Gln Arg
         1985                         1990                         1995
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ggc tct cgg gtc gcc tac gcc   tgg tac ttc tcg ctg   cag aag gtc        6039
Gly Ser Arg Val Ala Tyr Ala   Trp Tyr Phe Ser Leu   Gln Lys Val
    2000             2005                 2010

cag ggc gac tcg ctg gtc atc   ctg tcg ggc cgc gac   gtc acc tac        6084
Gln Gly Asp Ser Leu Val Ile   Leu Ser Gly Arg Asp   Val Thr Tyr
    2015             2020                 2025

acg ccc gtg gcc gcg ggg ctg   ttg gag atc cag gtg   cgc gcc ttc        6129
Thr Pro Val Ala Ala Gly Leu   Leu Glu Ile Gln Val   Arg Ala Phe
    2030             2035                 2040

aac gcc ctg ggc agt gag aac   cgc acg ctg gtg ctg   gag gtt cag        6174
Asn Ala Leu Gly Ser Glu Asn   Arg Thr Leu Val Leu   Glu Val Gln
    2045             2050                 2055

gac gcc gtc cag tat gtg gcc   ctg cag agc ggc ccc   tgc ttc acc        6219
Asp Ala Val Gln Tyr Val Ala   Leu Gln Ser Gly Pro   Cys Phe Thr
    2060             2065                 2070

aac cgc tcg gcg cag ttt gag   gcc gcc acc agc ccc   agc ccc cgg        6264
Asn Arg Ser Ala Gln Phe Glu   Ala Ala Thr Ser Pro   Ser Pro Arg
    2075             2080                 2085

cgt gtg gcc tac cac tgg gac   ttt ggg gat ggg tcg   cca ggg cag        6309
Arg Val Ala Tyr His Trp Asp   Phe Gly Asp Gly Ser   Pro Gly Gln
    2090             2095                 2100

gac aca gat gag ccc agg gcc   gag cac tcc tac ctg   agg cct ggg        6354
Asp Thr Asp Glu Pro Arg Ala   Glu His Ser Tyr Leu   Arg Pro Gly
    2105             2110                 2115

gac tac cgc gtg cag gtg aac   gcc tcc aac ctg gtg   agc ttc ttc        6399
Asp Tyr Arg Val Gln Val Asn   Ala Ser Asn Leu Val   Ser Phe Phe
    2120             2125                 2130

gtg gcg cag gcc acg gtg acc   gtc cag gtg ctg gcc   tgc cgg gag        6444
Val Ala Gln Ala Thr Val Thr   Val Gln Val Leu Ala   Cys Arg Glu
    2135             2140                 2145

ccg gag gtg gac gtg gtc ctg   ccc ctg cag gtg ctg   atg cgg cga        6489
Pro Glu Val Asp Val Val Leu   Pro Leu Gln Val Leu   Met Arg Arg
    2150             2155                 2160

tca cag cgc aac tac ttg gag   gcc cac gtt gac ctg   cgc gac tgc        6534
Ser Gln Arg Asn Tyr Leu Glu   Ala His Val Asp Leu   Arg Asp Cys
    2165             2170                 2175

gtc acc tac cag act gag tac   cgc tgg gag gtg tat   cgc acc gcc        6579
Val Thr Tyr Gln Thr Glu Tyr   Arg Trp Glu Val Tyr   Arg Thr Ala
    2180             2185                 2190

agc tgc cag cgg ccg ggg cgc   cca gcg cgt gtg gcc   ctg ccc ggc        6624
Ser Cys Gln Arg Pro Gly Arg   Pro Ala Arg Val Ala   Leu Pro Gly
    2195             2200                 2205

gtg gac gtg agc cgg cct cgg   ctg gtg ctg ccg cgg   ctg gcg ctg        6669
Val Asp Val Ser Arg Pro Arg   Leu Val Leu Pro Arg   Leu Ala Leu
    2210             2215                 2220
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cct gtg ggg cac tac tgc ttt  gtg ttt gtc gtg tca  ttt ggg gac       6714
Pro Val Gly His Tyr Cys Phe  Val Phe Val Val Ser  Phe Gly Asp
    2225                2230             2235

acg cca ctg aca cag agc atc  cag gcc aat gtg acg  gtg gcc ccc       6759
Thr Pro Leu Thr Gln Ser Ile  Gln Ala Asn Val Thr  Val Ala Pro
    2240                2245             2250

gag cgc ctg gtg ccc atc att  gag ggt ggc tca tac  cgc gtg tgg       6804
Glu Arg Leu Val Pro Ile Ile  Glu Gly Gly Ser Tyr  Arg Val Trp
    2255                2260             2265

tca gac aca cgg gac ctg gtg  ctg gat ggg agc gag  tcc tac gac       6849
Ser Asp Thr Arg Asp Leu Val  Leu Asp Gly Ser Glu  Ser Tyr Asp
    2270                2275             2280

ccc aac ctg gag gac ggc gac  cag acg ccg ctc agt  ttc cac tgg       6894
Pro Asn Leu Glu Asp Gly Asp  Gln Thr Pro Leu Ser  Phe His Trp
    2285                2290             2295

gcc tgt gtg gct tcg aca cag  agg gag gct ggc ggg  tgt gcg ctg       6939
Ala Cys Val Ala Ser Thr Gln  Arg Glu Ala Gly Gly  Cys Ala Leu
    2300                2305             2310

aac ttt ggg ccc cgc ggg agc  agc acg gtc acc att  cca cgg gag       6984
Asn Phe Gly Pro Arg Gly Ser  Ser Thr Val Thr Ile  Pro Arg Glu
    2315                2320             2325

cgg ctg gcg gct ggc gtg gag  tac acc ttc agc ctg  acc gtg tgg       7029
Arg Leu Ala Ala Gly Val Glu  Tyr Thr Phe Ser Leu  Thr Val Trp
    2330                2335             2340

aag gcc ggc cgc aag gag gag  gcc acc aac cag acg  gtg ctg atc       7074
Lys Ala Gly Arg Lys Glu Glu  Ala Thr Asn Gln Thr  Val Leu Ile
    2345                2350             2355

cgg agt ggc cgg gtg ccc att  gtg tcc ttg gag tgt  gtg tcc tgc       7119
Arg Ser Gly Arg Val Pro Ile  Val Ser Leu Glu Cys  Val Ser Cys
    2360                2365             2370

aag gca cag gcc gtg tac gaa  gtg agc cgc agc tcc  tac gtg tac       7164
Lys Ala Gln Ala Val Tyr Glu  Val Ser Arg Ser Ser  Tyr Val Tyr
    2375                2380             2385

ttg gag ggc cgc tgc ctc aat  tgc agc agc ggc tcc  aag cga ggg       7209
Leu Glu Gly Arg Cys Leu Asn  Cys Ser Ser Gly Ser  Lys Arg Gly
    2390                2395             2400

cgg tgg gct gca cgt acg ttc  agc aac aag acg ctg  gtg ctg gat       7254
Arg Trp Ala Ala Arg Thr Phe  Ser Asn Lys Thr Leu  Val Leu Asp
    2405                2410             2415

gag acc acc aca tcc acg ggc  agt gca ggc atg cga  ctg gtg ctg       7299
Glu Thr Thr Thr Ser Thr Gly  Ser Ala Gly Met Arg  Leu Val Leu
    2420                2425             2430

cgg cgg ggc gtg ctg cgg gac  ggc gag gga tac acc  ttc acg ctc       7344
Arg Arg Gly Val Leu Arg Asp  Gly Glu Gly Tyr Thr  Phe Thr Leu
    2435                2440             2445

acg gtg ctg ggc cgc tct ggc  gag gag gag ggc tgc  gcc tcc atc       7389
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Thr Val Leu Gly Arg Ser Gly   Glu Glu Glu Gly Cys   Ala Ser Ile
2450                2455                 2460


cgc ctg tcc ccc aac cgc ccg   ccg ctg ggg ggc tct   tgc cgc ctc        7434
Arg Leu Ser Pro Asn Arg Pro   Pro Leu Gly Gly Ser   Cys Arg Leu
2465                2470                 2475


ttc cca ctg ggc gct gtg cac   gcc ctc acc acc aag   gtg cac ttc        7479
Phe Pro Leu Gly Ala Val His   Ala Leu Thr Thr Lys   Val His Phe
2480                2485                 2490


gaa tgc acg ggc tgg cat gac   gcg gag gat gct ggc   gcc ccg ctg        7524
Glu Cys Thr Gly Trp His Asp   Ala Glu Asp Ala Gly   Ala Pro Leu
2495                2500                 2505


gtg tac gcc ctg ctg ctg cgg   cgc tgt cgc cag ggc   cac tgc gag        7569
Val Tyr Ala Leu Leu Leu Arg   Arg Cys Arg Gln Gly   His Cys Glu
2510                2515                 2520


gag ttc tgt gtc tac aag ggc   agc ctc tcc agc tac   gga gcc gtg        7614
Glu Phe Cys Val Tyr Lys Gly   Ser Leu Ser Ser Tyr   Gly Ala Val
2525                2530                 2535


ctg ccc ccg ggt ttc agg cca   cac ttc gag gtg ggc   ctg gcc gtg        7659
Leu Pro Pro Gly Phe Arg Pro   His Phe Glu Val Gly   Leu Ala Val
2540                2545                 2550


gtg gtg cag gac cag ctg gga   gcc gct gtg gtc gcc   ctc aac agg        7704
Val Val Gln Asp Gln Leu Gly   Ala Ala Val Val Ala   Leu Asn Arg
2555                2560                 2565


tct ttg gcc atc acc ctc cca   gag ccc aac ggc agc   gca acg ggg        7749
Ser Leu Ala Ile Thr Leu Pro   Glu Pro Asn Gly Ser   Ala Thr Gly
2570                2575                 2580


ctc aca gtc tgg ctg cac ggg   ctc acc gct agt gtg   ctc cca ggg        7794
Leu Thr Val Trp Leu His Gly   Leu Thr Ala Ser Val   Leu Pro Gly
2585                2590                 2595


ctg ctg cgg cag gcc gat ccc   cag cac gtc atc gag   tac tcg ttg        7839
Leu Leu Arg Gln Ala Asp Pro   Gln His Val Ile Glu   Tyr Ser Leu
2600                2605                 2610


gcc ctg gtc acc gtg ctg aac   gag tac gag cgg gcc   ctg gac gtg        7884
Ala Leu Val Thr Val Leu Asn   Glu Tyr Glu Arg Ala   Leu Asp Val
2615                2620                 2625


gcg gca gag ccc aag cac gag   cgg cag cac cga gcc   cag ata cgc        7929
Ala Ala Glu Pro Lys His Glu   Arg Gln His Arg Ala   Gln Ile Arg
2630                2635                 2640


aag aac atc acg gag act ctg   gtg tcc ctg agg gtc   cac act gtg        7974
Lys Asn Ile Thr Glu Thr Leu   Val Ser Leu Arg Val   His Thr Val
2645                2650                 2655


gat gac atc cag cag atc gct   gct gcg ctg gcc cag   tgc atg ggg        8019
Asp Asp Ile Gln Gln Ile Ala   Ala Ala Leu Ala Gln   Cys Met Gly
2660                2665                 2670


ccc agc agg gag ctc gta tgc   cgc tcg tgc ctg aag   cag acg ctg        8064
Pro Ser Arg Glu Leu Val Cys   Arg Ser Cys Leu Lys   Gln Thr Leu
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        2675                    2680                    2685

cac aag ctg gag gcc atg atg  ctc atc ctg cag gca  gag acc acc      8109
His Lys Leu Glu Ala Met Met  Leu Ile Leu Gln Ala  Glu Thr Thr
        2690                    2695                    2700

gcg ggc acc gtg acg ccc acc  gcc atc gga gac agc  atc ctc aac      8154
Ala Gly Thr Val Thr Pro Thr  Ala Ile Gly Asp Ser  Ile Leu Asn
        2705                    2710                    2715

atc aca gga gac ctc atc cac  ctg gcc agc tcg gac  gtg cgg gca      8199
Ile Thr Gly Asp Leu Ile His  Leu Ala Ser Ser Asp  Val Arg Ala
        2720                    2725                    2730

cca cag ccc tca gag ctg gga  gcc gag tca cca tct  cgg atg gtg      8244
Pro Gln Pro Ser Glu Leu Gly  Ala Glu Ser Pro Ser  Arg Met Val
        2735                    2740                    2745

gcg tcc cag gcc tac aac ctg  acc tct gcc ctc atg  cgc atc ctc      8289
Ala Ser Gln Ala Tyr Asn Leu  Thr Ser Ala Leu Met  Arg Ile Leu
        2750                    2755                    2760

atg cgc tcc cgc gtg ctc aac  gag gag ccc ctg acg  ctg gcg ggc      8334
Met Arg Ser Arg Val Leu Asn  Glu Glu Pro Leu Thr  Leu Ala Gly
        2765                    2770                    2775

gag gag atc gtg gcc cag ggc  aag cgc tcg gac ccg  cgg agc ctg      8379
Glu Glu Ile Val Ala Gln Gly  Lys Arg Ser Asp Pro  Arg Ser Leu
        2780                    2785                    2790

ctg tgc tat ggc ggc gcc cca  ggg cct ggc tgc cac  ttc tcc atc      8424
Leu Cys Tyr Gly Gly Ala Pro  Gly Pro Gly Cys His  Phe Ser Ile
        2795                    2800                    2805

ccc gag gct ttc agc ggg gcc  ctg gcc aac ctc agt  gac gtg gtg      8469
Pro Glu Ala Phe Ser Gly Ala  Leu Ala Asn Leu Ser  Asp Val Val
        2810                    2815                    2820

cag ctc atc ttt ctg gtg gac  tcc aat ccc ttt ccc  ttt ggc tat      8514
Gln Leu Ile Phe Leu Val Asp  Ser Asn Pro Phe Pro  Phe Gly Tyr
        2825                    2830                    2835

atc agc aac tac acc gtc tcc  acc aag gtg gcc tcg  atg gca ttc      8559
Ile Ser Asn Tyr Thr Val Ser  Thr Lys Val Ala Ser  Met Ala Phe
        2840                    2845                    2850

cag aca cag gcc ggc gcc cag  atc ccc atc gag cgg  ctg gcc tca      8604
Gln Thr Gln Ala Gly Ala Gln  Ile Pro Ile Glu Arg  Leu Ala Ser
        2855                    2860                    2865

gag cgc gcc atc acc gtg aag  gtg ccc aac aac tcg  gac tgg gct      8649
Glu Arg Ala Ile Thr Val Lys  Val Pro Asn Asn Ser  Asp Trp Ala
        2870                    2875                    2880

gcc cgg ggc cac cgc agc tcc  gcc aac tcc gcc aac  tcc gtt gtg      8694
Ala Arg Gly His Arg Ser Ser  Ala Asn Ser Ala Asn  Ser Val Val
        2885                    2890                    2895

gtc cag ccc cag gcc tcc gtc  ggt gct gtg gtc acc  ctg gac agc      8739
Val Gln Pro Gln Ala Ser Val  Gly Ala Val Val Thr  Leu Asp Ser
        2900                    2905                    2910
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agc aac  cct gcg gcc ggg ctg  cat ctg cag ctc aac  tat acg ctg        8784
Ser Asn  Pro Ala Ala Gly Leu  His Leu Gln Leu Asn  Tyr Thr Leu
2915             2920                 2925

ctg gac  ggc cac tac ctg tct  gag gaa cct gag ccc  tac ctg gca        8829
Leu Asp  Gly His Tyr Leu Ser  Glu Glu Pro Glu Pro  Tyr Leu Ala
2930             2935                 2940

gtc tac  cta cac tcg gag ccc  cgg ccc aat gag cac  aac tgc tcg        8874
Val Tyr  Leu His Ser Glu Pro  Arg Pro Asn Glu His  Asn Cys Ser
2945             2950                 2955

gct agc  agg agg atc cgc cca  gag tca ctc cag ggt  gct gac cac        8919
Ala Ser  Arg Arg Ile Arg Pro  Glu Ser Leu Gln Gly  Ala Asp His
2960             2965                 2970

cgg ccc  tac acc ttc ttc att  tcc ccg ggg agc aga  gac cca gcg        8964
Arg Pro  Tyr Thr Phe Phe Ile  Ser Pro Gly Ser Arg  Asp Pro Ala
2975             2980                 2985

ggg agt  tac cat ctg aac ctc  tcc agc cac ttc cgc  tgg tcg gcg        9009
Gly Ser  Tyr His Leu Asn Leu  Ser Ser His Phe Arg  Trp Ser Ala
2990             2995                 3000

ctg cag  gtg tcc gtg ggc ctg  tac acg tcc ctg tgc  cag tac ttc        9054
Leu Gln  Val Ser Val Gly Leu  Tyr Thr Ser Leu Cys  Gln Tyr Phe
3005             3010                 3015

agc gag  gag gac atg gtg tgg  cgg aca gag ggg ctg  ctg ccc ctg        9099
Ser Glu  Glu Asp Met Val Trp  Arg Thr Glu Gly Leu  Leu Pro Leu
3020             3025                 3030

gag gag  acc tcg ccc cgc cag  gcc gtc tgc ctc acc  cgc cac ctc        9144
Glu Glu  Thr Ser Pro Arg Gln  Ala Val Cys Leu Thr  Arg His Leu
3035             3040                 3045

acc gcc  ttc ggc gcc agc ctc  ttc gtg ccc cca agc  cat gtc cgc        9189
Thr Ala  Phe Gly Ala Ser Leu  Phe Val Pro Pro Ser  His Val Arg
3050             3055                 3060

ttt gtg  ttt cct gag ccg aca  gcg gat gta aac tac  atc gtc atg        9234
Phe Val  Phe Pro Glu Pro Thr  Ala Asp Val Asn Tyr  Ile Val Met
3065             3070                 3075

ctg aca  tgt gct gtg tgc ctg  gtg acc tac atg gtc  atg gcc gcc        9279
Leu Thr  Cys Ala Val Cys Leu  Val Thr Tyr Met Val  Met Ala Ala
3080             3085                 3090

atc ctg  cac aag ctg gac cag  ttg gat gcc agc cgg  ggc cgc gcc        9324
Ile Leu  His Lys Leu Asp Gln  Leu Asp Ala Ser Arg  Gly Arg Ala
3095             3100                 3105

atc cct  ttc tgt ggg cag cgg  ggc cgc ttc aag tac  gag atc ctc        9369
Ile Pro  Phe Cys Gly Gln Arg  Gly Arg Phe Lys Tyr  Glu Ile Leu
3110             3115                 3120

gtc aag  aca ggc tgg ggc cgg  ggc tca ggt acc acg  gcc cac gtg        9414
Val Lys  Thr Gly Trp Gly Arg  Gly Ser Gly Thr Thr  Ala His Val
3125             3130                 3135
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ggc atc atg ctg tat ggg gtg  gac agc cgg agc ggc  cac cgg cac       9459
Gly Ile Met Leu Tyr Gly Val  Asp Ser Arg Ser Gly  His Arg His
    3140            3145              3150

ctg gac ggc gac aga gcc ttc  cac cgc aac agc ctg  gac atc ttc       9504
Leu Asp Gly Asp Arg Ala Phe  His Arg Asn Ser Leu  Asp Ile Phe
    3155            3160              3165

cgg atc gcc acc ccg cac agc  ctg ggt agc gtg tgg  aag atc cga       9549
Arg Ile Ala Thr Pro His Ser  Leu Gly Ser Val Trp  Lys Ile Arg
    3170            3175              3180

gtg tgg cac gac aac aaa ggg  ctc agc cct gcc tgg  ttc ctg cag       9594
Val Trp His Asp Asn Lys Gly  Leu Ser Pro Ala Trp  Phe Leu Gln
    3185            3190              3195

cac gtc atc gtc agg gac ctg  cag acg gca cgc agc  gcc ttc ttc       9639
His Val Ile Val Arg Asp Leu  Gln Thr Ala Arg Ser  Ala Phe Phe
    3200            3205              3210

ctg gtc aat gac tgg ctt tcg  gtg gag acg gag gcc  aac ggg ggc       9684
Leu Val Asn Asp Trp Leu Ser  Val Glu Thr Glu Ala  Asn Gly Gly
    3215            3220              3225

ctg gtg gag aag gag gtg ctg  gcc gcg agc gac gca  gcc ctt ttg       9729
Leu Val Glu Lys Glu Val Leu  Ala Ala Ser Asp Ala  Ala Leu Leu
    3230            3235              3240

cgc ttc cgg cgc ctg ctg gtg  gct gag ctg cag cgt  ggc ttc ttt       9774
Arg Phe Arg Arg Leu Leu Val  Ala Glu Leu Gln Arg  Gly Phe Phe
    3245            3250              3255

gac aag cac atc tgg ctc tcc  ata tgg gac cgg ccg  cct cgt agc       9819
Asp Lys His Ile Trp Leu Ser  Ile Trp Asp Arg Pro  Pro Arg Ser
    3260            3265              3270

cgt ttc act cgc atc cag agg  gcc acc tgc tgc gtt  ctc ctc atc       9864
Arg Phe Thr Arg Ile Gln Arg  Ala Thr Cys Cys Val  Leu Leu Ile
    3275            3280              3285

tgc ctc ttc ctg ggc gcc aac  gcc gtg tgg tac ggg  gct gtt ggc       9909
Cys Leu Phe Leu Gly Ala Asn  Ala Val Trp Tyr Gly  Ala Val Gly
    3290            3295              3300

gac tct gcc tac agc acg ggg  cat gtg tcc agg ctg  agc ccg ctg       9954
Asp Ser Ala Tyr Ser Thr Gly  His Val Ser Arg Leu  Ser Pro Leu
    3305            3310              3315

agc gtc gac aca gtc gct gtt  ggc ctg gtg tcc agc  gtg gtt gtc       9999
Ser Val Asp Thr Val Ala Val  Gly Leu Val Ser Ser  Val Val Val
    3320            3325              3330

tat ccc gtc tac ctg gcc atc  ctt ttt ctc ttc cgg  atg tcc cgg       10044
Tyr Pro Val Tyr Leu Ala Ile  Leu Phe Leu Phe Arg  Met Ser Arg
    3335            3340              3345

agc aag gtg gct ggg agc ccg  agc ccc aca cct gcc  ggg cag cag       10089
Ser Lys Val Ala Gly Ser Pro  Ser Pro Thr Pro Ala  Gly Gln Gln
    3350            3355              3360

gtg ctg gac atc gac agc tgc  ctg gac tcg tcc gtg  ctg gac agc       10134
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Val Leu  Asp Ile Asp Ser Cys  Leu Asp Ser Ser Val  Leu Asp Ser
    3365             3370              3375

tcc ttc  ctc acg ttc tca ggc  ctc cac gct gag cag  gcc ttt gtt    10179
Ser Phe  Leu Thr Phe Ser Gly  Leu His Ala Glu Gln  Ala Phe Val
    3380             3385              3390

gga cag  atg aag agt gac ttg  ttt ctg gat gat tct  aag agt ctg    10224
Gly Gln  Met Lys Ser Asp Leu  Phe Leu Asp Asp Ser  Lys Ser Leu
    3395             3400              3405

gtg tgc  tgg ccc tcc ggc gag  gga acg ctc agt tgg  ccg gac ctg    10269
Val Cys  Trp Pro Ser Gly Glu  Gly Thr Leu Ser Trp  Pro Asp Leu
    3410             3415              3420

ctc agt  gac ccg tcc att gtg  ggt agc aat ctg cgg  cag ctg gca    10314
Leu Ser  Asp Pro Ser Ile Val  Gly Ser Asn Leu Arg  Gln Leu Ala
    3425             3430              3435

cgg ggc  cag gcg ggc cat ggg  ctg ggc cca gag gag  gac ggc ttc    10359
Arg Gly  Gln Ala Gly His Gly  Leu Gly Pro Glu Glu  Asp Gly Phe
    3440             3445              3450

tcc ctg  gcc agc ccc tac tcg  cct gcc aaa tcc ttc  tca gca tca    10404
Ser Leu  Ala Ser Pro Tyr Ser  Pro Ala Lys Ser Phe  Ser Ala Ser
    3455             3460              3465

gat gaa  gac ctg atc cag cag  gtc ctt gcc gag ggg  gtc agc agc    10449
Asp Glu  Asp Leu Ile Gln Gln  Val Leu Ala Glu Gly  Val Ser Ser
    3470             3475              3480

cca gcc  cct acc caa gac acc  cac atg gaa acg gac  ctg ctc agc    10494
Pro Ala  Pro Thr Gln Asp Thr  His Met Glu Thr Asp  Leu Leu Ser
    3485             3490              3495

agc ctg  tcc agc act cct ggg  gag aag aca gag acg  ctg gcg ctg    10539
Ser Leu  Ser Ser Thr Pro Gly  Glu Lys Thr Glu Thr  Leu Ala Leu
    3500             3505              3510

cag agg  ctg ggg gag ctg ggg  cca ccc agc cca ggc  ctg aac tgg    10584
Gln Arg  Leu Gly Glu Leu Gly  Pro Pro Ser Pro Gly  Leu Asn Trp
    3515             3520              3525

gaa cag  ccc cag gca gcg agg  ctg tcc agg aca gga  ctg gtg gag    10629
Glu Gln  Pro Gln Ala Ala Arg  Leu Ser Arg Thr Gly  Leu Val Glu
    3530             3535              3540

ggt ctg  cgg aag cgc ctg ctg  ccg gcc tgg tgt gcc  tcc ctg gcc    10674
Gly Leu  Arg Lys Arg Leu Leu  Pro Ala Trp Cys Ala  Ser Leu Ala
    3545             3550              3555

cac ggg  ctc agc ctg ctc ctg  gtg gct gtg gct gtg  gct gtc tca    10719
His Gly  Leu Ser Leu Leu Leu  Val Ala Val Ala Val  Ala Val Ser
    3560             3565              3570

ggg tgg  gtg ggt gcg agc ttc  ccc ccg ggc gtg agt  gtt gcg tgg    10764
Gly Trp  Val Gly Ala Ser Phe  Pro Pro Gly Val Ser  Val Ala Trp
    3575             3580              3585

ctc ctg  tcc agc agc gcc agc  ttc ctg gcc tca ttc  ctc ggc tgg    10809
Leu Leu  Ser Ser Ser Ala Ser  Phe Leu Ala Ser Phe  Leu Gly Trp
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        3590                      3595                      3600

gag cca  ctg aag gtc ttg ctg  gaa gcc ctg tac ttc  tca ctg gtg     10854
Glu Pro  Leu Lys Val Leu Leu  Glu Ala Leu Tyr Phe  Ser Leu Val
        3605                      3610                      3615

gcc aag  cgg ctg cac ccg gat  gaa gat gac acc ctg  gta gag agc     10899
Ala Lys  Arg Leu His Pro Asp  Glu Asp Asp Thr Leu  Val Glu Ser
        3620                      3625                      3630

ccg gct  gtg acg cct gtg agc  gca cgt gtg ccc cgc  gta cgg cca     10944
Pro Ala  Val Thr Pro Val Ser  Ala Arg Val Pro Arg  Val Arg Pro
        3635                      3640                      3645

ccc cac  ggc ttt gca ctc ttc  ctg gcc aag gaa gaa  gcc cgc aag     10989
Pro His  Gly Phe Ala Leu Phe  Leu Ala Lys Glu Glu  Ala Arg Lys
        3650                      3655                      3660

gtc aag  agg cta cat ggc atg  ctg cgg agc ctc ctg  gtg tac atg     11034
Val Lys  Arg Leu His Gly Met  Leu Arg Ser Leu Leu  Val Tyr Met
        3665                      3670                      3675

ctt ttt  ctg ctg gtg acc ctg  ctg gcc agc tat ggg  gat gcc tca     11079
Leu Phe  Leu Leu Val Thr Leu  Leu Ala Ser Tyr Gly  Asp Ala Ser
        3680                      3685                      3690

tgc cat  ggg cac gcc tac cgt  ctg caa agc gcc atc  aag cag gag     11124
Cys His  Gly His Ala Tyr Arg  Leu Gln Ser Ala Ile  Lys Gln Glu
        3695                      3700                      3705

ctg cac  agc cgg gcc ttc ctg  gcc atc acg cgg tct  gag gag ctc     11169
Leu His  Ser Arg Ala Phe Leu  Ala Ile Thr Arg Ser  Glu Glu Leu
        3710                      3715                      3720

tgg cca  tgg atg gcc cac gtg  ctg ctg ccc tac gtc  cac ggg aac     11214
Trp Pro  Trp Met Ala His Val  Leu Leu Pro Tyr Val  His Gly Asn
        3725                      3730                      3735

cag tcc  agc cca gag ctg ggg  ccc cca cgg ctg cgg  cag gtg cgg     11259
Gln Ser  Ser Pro Glu Leu Gly  Pro Pro Arg Leu Arg  Gln Val Arg
        3740                      3745                      3750

ctg cag  gaa gca ctc tac cca  gac cct ccc ggc ccc  agg gtc cac     11304
Leu Gln  Glu Ala Leu Tyr Pro  Asp Pro Pro Gly Pro  Arg Val His
        3755                      3760                      3765

acg tgc  tcg gcc gca gga ggc  ttc agc acc agc gat  tac gac gtt     11349
Thr Cys  Ser Ala Ala Gly Gly  Phe Ser Thr Ser Asp  Tyr Asp Val
        3770                      3775                      3780

ggc tgg  gag agt cct cac aat  ggc tcg ggg acg tgg  gcc tat tca     11394
Gly Trp  Glu Ser Pro His Asn  Gly Ser Gly Thr Trp  Ala Tyr Ser
        3785                      3790                      3795

gcg ccg  gat ctg ctg ggg gca  tgg tcc tgg ggc tcc  tgt gcc gtg     11439
Ala Pro  Asp Leu Leu Gly Ala  Trp Ser Trp Gly Ser  Cys Ala Val
        3800                      3805                      3810

tat gac  agc ggg ggc tac gtg  cag gag ctg ggc ctg  agc ctg gag     11484
Tyr Asp  Ser Gly Gly Tyr Val  Gln Glu Leu Gly Leu  Ser Leu Glu
        3815                      3820                      3825
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gag agc cgc gac cgg ctg cgc  ttc ctg cag ctg cac  aac tgg ctg          11529
Glu Ser Arg Asp Arg Leu Arg  Phe Leu Gln Leu His  Asn Trp Leu
    3830             3835              3840


gac aac agg agc cgc gct gtg  ttc ctg gag ctc acg  cgc tac agc          11574
Asp Asn Arg Ser Arg Ala Val  Phe Leu Glu Leu Thr  Arg Tyr Ser
    3845             3850              3855


ccg gcc gtg ggg ctg cac gcc  gcc gtc acg ctg cgc  ctc gag ttc          11619
Pro Ala Val Gly Leu His Ala  Ala Val Thr Leu Arg  Leu Glu Phe
    3860             3865              3870


ccg gcg gcc ggc cgc gcc ctg  gcc gcc ctc agc gtc  cgc ccc ttt          11664
Pro Ala Ala Gly Arg Ala Leu  Ala Ala Leu Ser Val  Arg Pro Phe
    3875             3880              3885


gcg ctg cgc cgc ctc agc gcg  ggc ctc tcg ctg cct  ctg ctc acc          11709
Ala Leu Arg Arg Leu Ser Ala  Gly Leu Ser Leu Pro  Leu Leu Thr
    3890             3895              3900


tcg gtg tgc ctg ctg ctg ttc  gcc gtg cac ttc gcc  gtg gcc gag          11754
Ser Val Cys Leu Leu Leu Phe  Ala Val His Phe Ala  Val Ala Glu
    3905             3910              3915


gcc cgt act tgg cac agg gaa  ggg cgc tgg cgc gtg  ctg cgg ctc          11799
Ala Arg Thr Trp His Arg Glu  Gly Arg Trp Arg Val  Leu Arg Leu
    3920             3925              3930


gga gcc tgg gcg cgg tgg ctg  ctg gtg gcg ctg acg  gcg gcc acg          11844
Gly Ala Trp Ala Arg Trp Leu  Leu Val Ala Leu Thr  Ala Ala Thr
    3935             3940              3945


gca ctg gta cgc ctc gcc cag  ctg ggt gcc gct gac  cgc cag tgg          11889
Ala Leu Val Arg Leu Ala Gln  Leu Gly Ala Ala Asp  Arg Gln Trp
    3950             3955              3960


acc cgt ttc gtg cgc ggc cgc  ccg cgc cgc ttc act  agc ttc gac          11934
Thr Arg Phe Val Arg Gly Arg  Pro Arg Arg Phe Thr  Ser Phe Asp
    3965             3970              3975


cag gtg gcg cac gtg agc tcc  gca gcc cgt ggc ctg  gcg gcc tcg          11979
Gln Val Ala His Val Ser Ser  Ala Ala Arg Gly Leu  Ala Ala Ser
    3980             3985              3990


ctg ctc ttc ctg ctt ttg gtc  aag gct gcc cag cac  gta cgc ttc          12024
Leu Leu Phe Leu Leu Leu Val  Lys Ala Ala Gln His  Val Arg Phe
    3995             4000              4005


gtg cgc cag tgg tcc gtc ttt  ggc aag aca tta tgc  cga gct ctg          12069
Val Arg Gln Trp Ser Val Phe  Gly Lys Thr Leu Cys  Arg Ala Leu
    4010             4015              4020


cca gag ctc ctg ggg gtc acc  ttg ggc ctg gtg gtg  ctc ggg gta          12114
Pro Glu Leu Leu Gly Val Thr  Leu Gly Leu Val Val  Leu Gly Val
    4025             4030              4035


gcc tac gcc cag ctg gcc atc  ctg ctc gtg tct tcc  tgt gtg gac          12159
Ala Tyr Ala Gln Leu Ala Ile  Leu Leu Val Ser Ser  Cys Val Asp
    4040             4045              4050
```

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tcc ctc  tgg agc gtg gcc cag  gcc ctg ttg gtg ctg  tgc cct ggg      12204
Ser Leu  Trp Ser Val Ala Gln  Ala Leu Leu Val Leu  Cys Pro Gly
    4055                4060                4065

act ggg  ctc tct acc ctg tgt  cct gcc gag tcc tgg  cac ctg tca      12249
Thr Gly  Leu Ser Thr Leu Cys  Pro Ala Glu Ser Trp  His Leu Ser
    4070                4075                4080

ccc ctg  ctg tgt gtg ggg ctc  tgg gca ctg cgg ctg  tgg ggc gcc      12294
Pro Leu  Leu Cys Val Gly Leu  Trp Ala Leu Arg Leu  Trp Gly Ala
    4085                4090                4095

cta cgg  ctg ggg gct gtt att  ctc cgc tgg cgc tac  cac gcc ttg      12339
Leu Arg  Leu Gly Ala Val Ile  Leu Arg Trp Arg Tyr  His Ala Leu
    4100                4105                4110

cgt gga  gag ctg tac cgg ccg  gcc tgg gag ccc cag  gac tac gag      12384
Arg Gly  Glu Leu Tyr Arg Pro  Ala Trp Glu Pro Gln  Asp Tyr Glu
    4115                4120                4125

atg gtg  gag ttg ttc ctg cgc  agg ctg cgc ctc tgg  atg ggc ctc      12429
Met Val  Glu Leu Phe Leu Arg  Arg Leu Arg Leu Trp  Met Gly Leu
    4130                4135                4140

agc aag  gtc aag gag ttc cgc  cac aaa gtc cgc ttt  gaa ggg atg      12474
Ser Lys  Val Lys Glu Phe Arg  His Lys Val Arg Phe  Glu Gly Met
    4145                4150                4155

gag ccg  ctg ccc tct cgc tcc  tcc agg ggc tcc aag  gta tcc ccg      12519
Glu Pro  Leu Pro Ser Arg Ser  Ser Arg Gly Ser Lys  Val Ser Pro
    4160                4165                4170

gat gtg  ccc cca ccc agc gct  ggc tcc gat gcc tcg  cac ccc tcc      12564
Asp Val  Pro Pro Pro Ser Ala  Gly Ser Asp Ala Ser  His Pro Ser
    4175                4180                4185

acc tcc  tcc agc cag ctg gat  ggg ctg agc gtg agc  ctg ggc cgg      12609
Thr Ser  Ser Ser Gln Leu Asp  Gly Leu Ser Val Ser  Leu Gly Arg
    4190                4195                4200

ctg ggg  aca agg tgt gag cct  gag ccc tcc cgc ctc  caa gcc gtg      12654
Leu Gly  Thr Arg Cys Glu Pro  Glu Pro Ser Arg Leu  Gln Ala Val
    4205                4210                4215

ttc gag  gcc ctg ctc acc cag  ttt gac cga ctc aac  cag gcc aca      12699
Phe Glu  Ala Leu Leu Thr Gln  Phe Asp Arg Leu Asn  Gln Ala Thr
    4220                4225                4230

gag gac  gtc tac cag ctg gag  cag cag ctg cac agc  ctg caa ggc      12744
Glu Asp  Val Tyr Gln Leu Glu  Gln Gln Leu His Ser  Leu Gln Gly
    4235                4240                4245

cgc agg  agc agc cgg gcg ccc  gcc gga tct tcc cgt  ggc cca tcc      12789
Arg Arg  Ser Ser Arg Ala Pro  Ala Gly Ser Ser Arg  Gly Pro Ser
    4250                4255                4260

ccg ggc  ctg cgg cca gca ctg  ccc agc cgc ctt gcc  cgg gcc agt      12834
Pro Gly  Leu Arg Pro Ala Leu  Pro Ser Arg Leu Ala  Arg Ala Ser
    4265                4270                4275

cgg ggt  gtg gac ctg gcc act  ggc ccc agc agg aca  ccc ctt cgg      12879
```

```
Arg Gly  Val Asp Leu Ala Thr  Gly Pro Ser Arg Thr  Pro Leu Arg
    4280                 4285             4290


gcc aag  aac aag gtc cac ccc  agc agc act tag                     12912
Ala Lys  Asn Lys Val His Pro  Ser Ser Thr
    4295                 4300
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<210> 2
<211> 4303
<212> PRT
<213> Homo sapiens PKD-1 gene

<400> 2

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Met Pro Pro Ala Ala Pro Ala Arg Leu Ala Leu Ala Leu Gly Leu Gly
1               5               10              15


Leu Trp Leu Gly Ala Leu Ala Gly Gly Pro Gly Arg Gly Cys Gly Pro
            20              25              30


Cys Glu Pro Pro Cys Leu Cys Gly Pro Ala Pro Gly Ala Ala Cys Arg
        35          40              45


Val Asn Cys Ser Gly Arg Gly Leu Arg Thr Leu Gly Pro Ala Leu Arg
        50          55              60


Ile Pro Ala Asp Ala Thr Glu Leu Asp Val Ser His Asn Leu Leu Arg
65              70              75              80


Ala Leu Asp Val Gly Leu Leu Ala Asn Leu Ser Ala Leu Ala Glu Leu
            85              90              95


Asp Ile Ser Asn Asn Lys Ile Ser Thr Leu Glu Glu Gly Ile Phe Ala
            100             105             110


Asn Leu Phe Asn Leu Ser Glu Ile Asn Leu Ser Gly Asn Pro Phe Glu
            115             120             125


Cys Asp Cys Gly Leu Ala Trp Leu Pro Gln Trp Ala Glu Glu Gln Gln
    130             135             140


Val Arg Val Val Gln Pro Glu Ala Ala Thr Cys Ala Gly Pro Gly Ser
145             150             155             160


Leu Ala Gly Gln Pro Leu Leu Gly Ile Pro Leu Leu Asp Ser Gly Cys
            165             170             175


Gly Glu Glu Tyr Val Ala Cys Leu Pro Asp Asn Ser Ser Gly Thr Val
        180             185             190
```

Ala Ala Val Ser Phe Ser Ala Ala His Glu Gly Leu Leu Gln Pro Glu
     195   200   205

Ala Cys Ser Ala Phe Cys Phe Ser Thr Gly Gln Gly Leu Ala Ala Leu
     210   215   220

Ser Glu Gln Gly Trp Cys Leu Cys Gly Ala Ala Gln Pro Ser Ser Ala
225   230   235   240

Ser Phe Ala Cys Leu Ser Leu Cys Ser Gly Pro Pro Ala Pro Pro Ala
           245   250   255

Pro Thr Cys Arg Gly Pro Thr Leu Leu Gln His Val Phe Pro Ala Ser
          260   265   270

Pro Gly Ala Thr Leu Val Gly Pro His Gly Pro Leu Ala Ser Gly Gln
        275   280   285

Leu Ala Ala Phe His Ile Ala Ala Pro Leu Pro Val Thr Asp Thr Arg
     290   295   300

Trp Asp Phe Gly Asp Gly Ser Ala Glu Val Asp Ala Ala Gly Pro Ala
305   310   315   320

Ala Ser His Arg Tyr Val Leu Pro Gly Arg Tyr His Val Thr Ala Val
          325   330   335

Leu Ala Leu Gly Ala Gly Ser Ala Leu Leu Gly Thr Asp Val Gln Val
        340   345   350

Glu Ala Ala Pro Ala Ala Leu Glu Leu Val Cys Pro Ser Ser Val Gln
        355   360   365

Ser Asp Glu Ser Leu Asp Leu Ser Ile Gln Asn Arg Gly Gly Ser Gly
     370   375   380

Leu Glu Ala Ala Tyr Ser Ile Val Ala Leu Gly Glu Glu Pro Ala Arg
385   390   395   400

Ala Val His Pro Leu Cys Pro Ser Asp Thr Glu Ile Phe Pro Gly Asn
          405   410   415

Gly His Cys Tyr Arg Leu Val Val Glu Lys Ala Ala Trp Leu Gln Ala
        420   425   430

Gln Glu Gln Cys Gln Ala Trp Ala Gly Ala Ala Leu Ala Met Val Asp
     435   440   445

Ser Pro Ala Val Gln Arg Phe Leu Val Ser Arg Val Thr Arg Ser Leu
     450   455   460

Asp Val Trp Ile Gly Phe Ser Thr Val Gln Gly Val Glu Val Gly Pro
465   470   475   480

Ala Pro Gln Gly Glu Ala Phe Ser Leu Glu Ser Cys Gln Asn Trp Leu
          485   490   495

Pro Gly Glu Pro His Pro Ala Thr Ala Glu His Cys Val Arg Leu Gly
          500   505   510

Pro Thr Gly Trp Cys Asn Thr Asp Leu Cys Ser Ala Pro His Ser Tyr
          515   520   525

Val Cys Glu Leu Gln Pro Gly Gly Pro Val Gln Asp Ala Glu Asn Leu
     530   535   540

Leu Val Gly Ala Pro Ser Gly Asp Leu Gln Gly Pro Leu Thr Pro Leu
545   550   555   560

Ala Gln Gln Asp Gly Leu Ser Ala Pro His Glu Pro Val Glu Val Met
          565   570   575

Val Phe Pro Gly Leu Arg Leu Ser Arg Glu Ala Phe Leu Thr Thr Ala
          580   585   590

Glu Phe Gly Thr Gln Glu Leu Arg Arg Pro Ala Gln Leu Arg Leu Gln
          595   600   605

Val Tyr Arg Leu Leu Ser Thr Ala Gly Thr Pro Glu Asn Gly Ser Glu
     610   615   620

Pro Glu Ser Arg Ser Pro Asp Asn Arg Thr Gln Leu Ala Pro Ala Cys
625   630   635   640

Met Pro Gly Gly Arg Trp Cys Pro Gly Ala Asn Ile Cys Leu Pro Leu
          645   650   655

Asp Ala Ser Cys His Pro Gln Ala Cys Ala Asn Gly Cys Thr Ser Gly
          660   665   670

Pro Gly Leu Pro Gly Ala Pro Tyr Ala Leu Trp Arg Glu Phe Leu Phe
    675   680   685

Ser Val Pro Ala Gly Pro Pro Ala Gln Tyr Ser Val Thr Leu His Gly
    690   695   700

Gln Asp Val Leu Met Leu Pro Gly Asp Leu Val Gly Leu Gln His Asp
705   710   715   720

Ala Gly Pro Gly Ala Leu Leu His Cys Ser Pro Ala Pro Gly His Pro
          725   730   735

Gly Pro Arg Ala Pro Tyr Leu Ser Ala Asn Ala Ser Ser Trp Leu Pro
          740   745   750

His Leu Pro Ala Gln Leu Glu Gly Thr Trp Gly Cys Pro Ala Cys Ala
          755   760   765

Leu Arg Leu Leu Ala Gln Arg Glu Gln Leu Thr Val Leu Leu Gly Leu
          770   775   780

Arg Pro Asn Pro Gly Leu Arg Leu Pro Gly Arg Tyr Glu Val Arg Ala
785   790   795   800

Glu Val Gly Asn Gly Val Ser Arg His Asn Leu Ser Cys Ser Phe Asp
          805   810   815

Val Val Ser Pro Val Ala Gly Leu Arg Val Ile Tyr Pro Ala Pro Arg
          820   825   830

Asp Gly Arg Leu Tyr Val Pro Thr Asn Gly Ser Ala Leu Val Leu Gln
          835   840   845

Val Asp Ser Gly Ala Asn Ala Thr Ala Thr Ala Arg Trp Pro Gly Gly
          850   855   860

Ser Leu Ser Ala Arg Phe Glu Asn Val Cys Pro Ala Leu Val Ala Thr
865   870   875   880

Phe Val Pro Ala Cys Pro Trp Glu Thr Asn Asp Thr Leu Phe Ser Val
          885   890   895

Val Ala Leu Pro Trp Leu Ser Glu Gly Glu His Val Val Asp Val Val
          900   905   910

Val Glu Asn Ser Ala Ser Arg Ala Asn Leu Ser Leu Arg Val Thr Ala

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                915                    920                    925

       Glu Glu Pro Ile Cys Gly Leu Arg Ala Thr Pro Ser Pro Glu Ala Arg
           930                935                940


       Val Leu Gln Gly Val Leu Val Arg Tyr Ser Pro Val Val Glu Ala Gly
       945                950                955                960


       Ser Asp Met Val Phe Arg Trp Thr Ile Asn Asp Lys Gln Ser Leu Thr
                       965                970                975


       Phe Gln Asn Val Val Phe Asn Val Ile Tyr Gln Ser Ala Ala Val Phe
                       980                985                990


       Lys Leu Ser Leu Thr Ala Ser Asn  His Val Ser Asn Val  Thr Val Asn
               995                1000               1005


       Tyr Asn  Val Thr Val Glu Arg  Met Asn Arg Met Gln  Gly Leu Gln
           1010               1015               1020


       Val Ser  Thr Val Pro Ala Val  Leu Ser Pro Asn Ala  Thr Leu Ala
           1025               1030               1035


       Leu Thr  Ala Gly Val Leu Val  Asp Ser Ala Val Glu  Val Ala Phe
           1040               1045               1050


       Leu Trp  Thr Phe Gly Asp Gly  Glu Gln Ala Leu His  Gln Phe Gln
           1055               1060               1065


       Pro Pro  Tyr Asn Glu Ser Phe  Pro Val Pro Asp Pro  Ser Val Ala
           1070               1075               1080


       Gln Val  Leu Val Glu His Asn  Val Thr His Thr Tyr  Ala Ala Pro
           1085               1090               1095


       Gly Glu  Tyr Leu Leu Thr Val  Leu Ala Ser Asn Ala  Phe Glu Asn
           1100               1105               1110


       Leu Thr  Gln Gln Val Pro Val  Ser Val Arg Ala Ser  Leu Pro Ser
           1115               1120               1125


       Val Ala  Val Gly Val Ser Asp  Gly Val Leu Val Ala  Gly Arg Pro
           1130               1135               1140


       Val Thr  Phe Tyr Pro His Pro  Leu Pro Ser Pro Gly  Gly Val Leu
           1145               1150               1155
```

Tyr Thr Trp Asp Phe Gly Asp Gly Ser Pro Val Leu Thr Gln Ser
    1160   1165   1170

Gln Pro Ala Ala Asn His Thr Tyr Ala Ser Arg Gly Thr Tyr His
    1175   1180   1185

Val Arg Leu Glu Val Asn Asn Thr Val Ser Gly Ala Ala Ala Gln
    1190   1195   1200

Ala Asp Val Arg Val Phe Glu Glu Leu Arg Gly Leu Ser Val Asp
    1205   1210   1215

Met Ser Leu Ala Val Glu Gln Gly Ala Pro Val Val Val Ser Ala
    1220   1225   1230

Ala Val Gln Thr Gly Asp Asn Ile Thr Trp Thr Phe Asp Met Gly
    1235   1240   1245

Asp Gly Thr Val Leu Ser Gly Pro Glu Ala Thr Val Glu His Val
    1250   1255   1260

Tyr Leu Arg Ala Gln Asn Cys Thr Val Thr Val Gly Ala Gly Ser
    1265   1270   1275

Pro Ala Gly His Leu Ala Arg Ser Leu His Val Leu Val Phe Val
    1280   1285   1290

Leu Glu Val Leu Arg Val Glu Pro Ala Ala Cys Ile Pro Thr Gln
    1295   1300   1305

Pro Asp Ala Arg Leu Thr Ala Tyr Val Thr Gly Asn Pro Ala His
    1310   1315   1320

Tyr Leu Phe Asp Trp Thr Phe Gly Asp Gly Ser Ser Asn Thr Thr
    1325   1330   1335

Val Arg Gly Cys Pro Thr Val Thr His Asn Phe Thr Arg Ser Gly
    1340   1345   1350

Thr Phe Pro Leu Ala Leu Val Leu Ser Ser Arg Val Asn Arg Ala
    1355   1360   1365

His Tyr Phe Thr Ser Ile Cys Val Glu Pro Glu Val Gly Asn Val
    1370   1375   1380

Thr Leu Gln Pro Glu Arg Gln Phe Val Gln Leu Gly Asp Glu Ala
    1385   1390   1395

Trp Leu Val Ala Cys Ala Trp Pro Pro Phe Pro Tyr Arg Tyr Thr
    1400   1405   1410

Trp Asp Phe Gly Thr Glu Glu Ala Ala Pro Thr Arg Ala Arg Gly
    1415   1420   1425

Pro Glu Val Thr Phe Ile Tyr Arg Asp Pro Gly Ser Tyr Leu Val
    1430   1435   1440

Thr Val Thr Ala Ser Asn Asn Ile Ser Ala Ala Asn Asp Ser Ala
    1445   1450   1455

Leu Val Glu Val Gln Glu Pro Val Leu Val Thr Ser Ile Lys Val
    1460   1465   1470

Asn Gly Ser Leu Gly Leu Glu Leu Gln Gln Pro Tyr Leu Phe Ser
    1475   1480   1485

Ala Val Gly Arg Gly Arg Pro Ala Ser Tyr Leu Trp Asp Leu Gly
    1490   1495   1500

Asp Gly Gly Trp Leu Glu Gly Pro Glu Val Thr His Ala Tyr Asn
    1505   1510   1515

Ser Thr Gly Asp Phe Thr Val Arg Val Ala Gly Trp Asn Glu Val
    1520   1525   1530

Ser Arg Ser Glu Ala Trp Leu Asn Val Thr Val Lys Arg Arg Val
    1535   1540   1545

Arg Gly Leu Val Val Asn Ala Ser Arg Thr Val Val Pro Leu Asn
    1550   1555   1560

Gly Ser Val Ser Phe Ser Thr Ser Leu Glu Ala Gly Ser Asp Val
    1565   1570   1575

Arg Tyr Ser Trp Val Leu Cys Asp Arg Cys Thr Pro Ile Pro Gly
    1580   1585   1590

Gly Pro Thr Ile Ser Tyr Thr Phe Arg Ser Val Gly Thr Phe Asn
    1595   1600   1605

Ile Ile Val Thr Ala Glu Asn Glu Val Gly Ser Ala Gln Asp Ser
1610 1615 1620

Ile Phe Val Tyr Val Leu Gln Leu Ile Glu Gly Leu Gln Val Val
1625 1630 1635

Gly Gly Gly Arg Tyr Phe Pro Thr Asn His Thr Val Gln Leu Gln
1640 1645 1650

Ala Val Val Arg Asp Gly Thr Asn Val Ser Tyr Ser Trp Thr Ala
1655 1660 1665

Trp Arg Asp Arg Gly Pro Ala Leu Ala Gly Ser Gly Lys Gly Phe
1670 1675 1680

Ser Leu Thr Val Leu Glu Ala Gly Thr Tyr His Val Gln Leu Arg
1685 1690 1695

Ala Thr Asn Met Leu Gly Ser Ala Trp Ala Asp Cys Thr Met Asp
1700 1705 1710

Phe Val Glu Pro Val Gly Trp Leu Met Val Ala Ala Ser Pro Asn
1715 1720 1725

Pro Ala Ala Val Asn Thr Ser Val Thr Leu Ser Ala Glu Leu Ala
1730 1735 1740

Gly Gly Ser Gly Val Val Tyr Thr Trp Ser Leu Glu Glu Gly Leu
1745 1750 1755

Ser Trp Glu Thr Ser Glu Pro Phe Thr Thr His Ser Phe Pro Thr
1760 1765 1770

Pro Gly Leu His Leu Val Thr Met Thr Ala Gly Asn Pro Leu Gly
1775 1780 1785

Ser Ala Asn Ala Thr Val Glu Val Asp Val Gln Val Pro Val Ser
1790 1795 1800

Gly Leu Ser Ile Arg Ala Ser Glu Pro Gly Gly Ser Phe Val Ala
1805 1810 1815

Ala Gly Ser Ser Val Pro Phe Trp Gly Gln Leu Ala Thr Gly Thr
1820 1825 1830

Asn Val Ser Trp Cys Trp Ala Val Pro Gly Gly Ser Ser Lys Arg

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           1835                    1840                    1845


Gly Pro  His Val Thr Met Val  Phe Pro Asp Ala Gly  Thr Phe Ser
    1850                    1855                    1860


Ile Arg  Leu Asn Ala Ser Asn  Ala Val Ser Trp Val  Ser Ala Thr
    1865                    1870                    1875


Tyr Asn  Leu Thr Ala Glu Glu  Pro Ile Val Gly Leu  Val Leu Trp
    1880                    1885                    1890


Ala Ser  Ser Lys Val Val Ala  Pro Gly Gln Leu Val  His Phe Gln
    1895                    1900                    1905


Ile Leu  Leu Ala Ala Gly Ser  Ala Val Thr Phe Arg  Leu Gln Val
    1910                    1915                    1920


Gly Gly  Ala Asn Pro Glu Val  Leu Pro Gly Pro Arg  Phe Ser His
    1925                    1930                    1935


Ser Phe  Pro Arg Val Gly Asp  His Val Val Ser Val  Arg Gly Lys
    1940                    1945                    1950


Asn His  Val Ser Trp Ala Gln  Ala Gln Val Arg Ile  Val Val Leu
    1955                    1960                    1965


Glu Ala  Val Ser Gly Leu Gln  Val Pro Asn Cys Cys  Glu Pro Gly
    1970                    1975                    1980


Ile Ala  Thr Gly Thr Glu Arg  Asn Phe Thr Ala Arg  Val Gln Arg
    1985                    1990                    1995


Gly Ser  Arg Val Ala Tyr Ala  Trp Tyr Phe Ser Leu  Gln Lys Val
    2000                    2005                    2010


Gln Gly  Asp Ser Leu Val Ile  Leu Ser Gly Arg Asp  Val Thr Tyr
    2015                    2020                    2025


Thr Pro  Val Ala Ala Gly Leu  Leu Glu Ile Gln Val  Arg Ala Phe
    2030                    2035                    2040


Asn Ala  Leu Gly Ser Glu Asn  Arg Thr Leu Val Leu  Glu Val Gln
    2045                    2050                    2055


Asp Ala  Val Gln Tyr Val Ala  Leu Gln Ser Gly Pro  Cys Phe Thr
    2060                    2065                    2070
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Asn Arg Ser Ala Gln Phe Glu Ala Ala Thr Ser Pro Ser Pro Arg
    2075   2080   2085

Arg Val Ala Tyr His Trp Asp Phe Gly Asp Gly Ser Pro Gly Gln
    2090   2095   2100

Asp Thr Asp Glu Pro Arg Ala Glu His Ser Tyr Leu Arg Pro Gly
    2105   2110   2115

Asp Tyr Arg Val Gln Val Asn Ala Ser Asn Leu Val Ser Phe Phe
    2120   2125   2130

Val Ala Gln Ala Thr Val Thr Val Gln Val Leu Ala Cys Arg Glu
    2135   2140   2145

Pro Glu Val Asp Val Val Leu Pro Leu Gln Val Leu Met Arg Arg
    2150   2155   2160

Ser Gln Arg Asn Tyr Leu Glu Ala His Val Asp Leu Arg Asp Cys
    2165   2170   2175

Val Thr Tyr Gln Thr Glu Tyr Arg Trp Glu Val Tyr Arg Thr Ala
    2180   2185   2190

Ser Cys Gln Arg Pro Gly Arg Pro Ala Arg Val Ala Leu Pro Gly
    2195   2200   2205

Val Asp Val Ser Arg Pro Arg Leu Val Leu Pro Arg Leu Ala Leu
    2210   2215   2220

Pro Val Gly His Tyr Cys Phe Val Phe Val Val Ser Phe Gly Asp
    2225   2230   2235

Thr Pro Leu Thr Gln Ser Ile Gln Ala Asn Val Thr Val Ala Pro
    2240   2245   2250

Glu Arg Leu Val Pro Ile Ile Glu Gly Gly Ser Tyr Arg Val Trp
    2255   2260   2265

Ser Asp Thr Arg Asp Leu Val Leu Asp Gly Ser Glu Ser Tyr Asp
    2270   2275   2280

Pro Asn Leu Glu Asp Gly Asp Gln Thr Pro Leu Ser Phe His Trp
    2285   2290   2295

Ala Cys Val Ala Ser Thr Gln Arg Glu Ala Gly Gly Cys Ala Leu
2300   2305   2310

Asn Phe Gly Pro Arg Gly Ser Ser Thr Val Thr Ile Pro Arg Glu
2315   2320   2325

Arg Leu Ala Ala Gly Val Glu Tyr Thr Phe Ser Leu Thr Val Trp
2330   2335   2340

Lys Ala Gly Arg Lys Glu Glu Ala Thr Asn Gln Thr Val Leu Ile
2345   2350   2355

Arg Ser Gly Arg Val Pro Ile Val Ser Leu Glu Cys Val Ser Cys
2360   2365   2370

Lys Ala Gln Ala Val Tyr Glu Val Ser Arg Ser Ser Tyr Val Tyr
2375   2380   2385

Leu Glu Gly Arg Cys Leu Asn Cys Ser Ser Gly Ser Lys Arg Gly
2390   2395   2400

Arg Trp Ala Ala Arg Thr Phe Ser Asn Lys Thr Leu Val Leu Asp
2405   2410   2415

Glu Thr Thr Thr Ser Thr Gly Ser Ala Gly Met Arg Leu Val Leu
2420   2425   2430

Arg Arg Gly Val Leu Arg Asp Gly Glu Gly Tyr Thr Phe Thr Leu
2435   2440   2445

Thr Val Leu Gly Arg Ser Gly Glu Glu Glu Gly Cys Ala Ser Ile
2450   2455   2460

Arg Leu Ser Pro Asn Arg Pro Pro Leu Gly Gly Ser Cys Arg Leu
2465   2470   2475

Phe Pro Leu Gly Ala Val His Ala Leu Thr Thr Lys Val His Phe
2480   2485   2490

Glu Cys Thr Gly Trp His Asp Ala Glu Asp Ala Gly Ala Pro Leu
2495   2500   2505

Val Tyr Ala Leu Leu Leu Arg Arg Cys Arg Gln Gly His Cys Glu
2510   2515   2520

Glu Phe Cys Val Tyr Lys Gly Ser Leu Ser Ser Tyr Gly Ala Val
2525   2530   2535

Leu Pro Pro Gly Phe Arg Pro His Phe Glu Val Gly Leu Ala Val
2540   2545   2550

Val Val Gln Asp Gln Leu Gly Ala Ala Val Val Ala Leu Asn Arg
2555   2560   2565

Ser Leu Ala Ile Thr Leu Pro Glu Pro Asn Gly Ser Ala Thr Gly
2570   2575   2580

Leu Thr Val Trp Leu His Gly Leu Thr Ala Ser Val Leu Pro Gly
2585   2590   2595

Leu Leu Arg Gln Ala Asp Pro Gln His Val Ile Glu Tyr Ser Leu
2600   2605   2610

Ala Leu Val Thr Val Leu Asn Glu Tyr Glu Arg Ala Leu Asp Val
2615   2620   2625

Ala Ala Glu Pro Lys His Glu Arg Gln His Arg Ala Gln Ile Arg
2630   2635   2640

Lys Asn Ile Thr Glu Thr Leu Val Ser Leu Arg Val His Thr Val
2645   2650   2655

Asp Asp Ile Gln Gln Ile Ala Ala Ala Leu Ala Gln Cys Met Gly
2660   2665   2670

Pro Ser Arg Glu Leu Val Cys Arg Ser Cys Leu Lys Gln Thr Leu
2675   2680   2685

His Lys Leu Glu Ala Met Met Leu Ile Leu Gln Ala Glu Thr Thr
2690   2695   2700

Ala Gly Thr Val Thr Pro Thr Ala Ile Gly Asp Ser Ile Leu Asn
2705   2710   2715

Ile Thr Gly Asp Leu Ile His Leu Ala Ser Ser Asp Val Arg Ala
2720   2725   2730

Pro Gln Pro Ser Glu Leu Gly Ala Glu Ser Pro Ser Arg Met Val
2735   2740   2745

Ala Ser Gln Ala Tyr Asn Leu Thr Ser Ala Leu Met Arg Ile Leu

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Met Arg  Ser Arg Val Leu Asn  Glu Glu Pro Leu Thr  Leu Ala Gly
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Glu Glu  Ile Val Ala Gln Gly  Lys Arg Ser Asp Pro  Arg Ser Leu
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Leu Cys  Tyr Gly Gly Ala Pro  Gly Pro Gly Cys His  Phe Ser Ile
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Pro Glu  Ala Phe Ser Gly Ala  Leu Ala Asn Leu Ser  Asp Val Val
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Gln Leu  Ile Phe Leu Val Asp  Ser Asn Pro Phe Pro  Phe Gly Tyr
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Ile Ser  Asn Tyr Thr Val Ser  Thr Lys Val Ala Ser  Met Ala Phe
         2840                    2845                    2850

Gln Thr  Gln Ala Gly Ala Gln  Ile Pro Ile Glu Arg  Leu Ala Ser
         2855                    2860                    2865

Glu Arg  Ala Ile Thr Val Lys  Val Pro Asn Asn Ser  Asp Trp Ala
         2870                    2875                    2880

Ala Arg  Gly His Arg Ser Ser  Ala Asn Ser Ala Asn  Ser Val Val
         2885                    2890                    2895

Val Gln  Pro Gln Ala Ser Val  Gly Ala Val Val Thr  Leu Asp Ser
         2900                    2905                    2910

Ser Asn  Pro Ala Ala Gly Leu  His Leu Gln Leu Asn  Tyr Thr Leu
         2915                    2920                    2925

Leu Asp  Gly His Tyr Leu Ser  Glu Glu Pro Glu Pro  Tyr Leu Ala
         2930                    2935                    2940

Val Tyr  Leu His Ser Glu Pro  Arg Pro Asn Glu His  Asn Cys Ser
         2945                    2950                    2955

Ala Ser  Arg Arg Ile Arg Pro  Glu Ser Leu Gln Gly  Ala Asp His
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Arg Pro  Tyr Thr Phe Phe Ile  Ser Pro Gly Ser Arg  Asp Pro Ala
         2975                    2980                    2985
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Gly Ser Tyr His Leu Asn Leu Ser Ser His Phe Arg Trp Ser Ala
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Leu Gln Val Ser Val Gly Leu Tyr Thr Ser Leu Cys Gln Tyr Phe
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Ser Glu Glu Asp Met Val Trp Arg Thr Glu Gly Leu Leu Pro Leu
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Glu Glu Thr Ser Pro Arg Gln Ala Val Cys Leu Thr Arg His Leu
3035   3040   3045

Thr Ala Phe Gly Ala Ser Leu Phe Val Pro Pro Ser His Val Arg
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Phe Val Phe Pro Glu Pro Thr Ala Asp Val Asn Tyr Ile Val Met
3065   3070   3075

Leu Thr Cys Ala Val Cys Leu Val Thr Tyr Met Val Met Ala Ala
3080   3085   3090

Ile Leu His Lys Leu Asp Gln Leu Asp Ala Ser Arg Gly Arg Ala
3095   3100   3105

Ile Pro Phe Cys Gly Gln Arg Gly Arg Phe Lys Tyr Glu Ile Leu
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Val Lys Thr Gly Trp Gly Arg Gly Ser Gly Thr Thr Ala His Val
3125   3130   3135

Gly Ile Met Leu Tyr Gly Val Asp Ser Arg Ser Gly His Arg His
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Leu Asp Gly Asp Arg Ala Phe His Arg Asn Ser Leu Asp Ile Phe
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Arg Ile Ala Thr Pro His Ser Leu Gly Ser Val Trp Lys Ile Arg
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Val Trp His Asp Asn Lys Gly Leu Ser Pro Ala Trp Phe Leu Gln
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His Val Ile Val Arg Asp Leu Gln Thr Ala Arg Ser Ala Phe Phe
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Leu Val Asn Asp Trp Leu Ser Val Glu Thr Glu Ala Asn Gly Gly
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Leu Val Glu Lys Glu Val Leu Ala Ala Ser Asp Ala Ala Leu Leu
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Arg Phe Arg Arg Leu Leu Val Ala Glu Leu Gln Arg Gly Phe Phe
3245   3250   3255

Asp Lys His Ile Trp Leu Ser Ile Trp Asp Arg Pro Pro Arg Ser
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Arg Phe Thr Arg Ile Gln Arg Ala Thr Cys Cys Val Leu Leu Ile
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Cys Leu Phe Leu Gly Ala Asn Ala Val Trp Tyr Gly Ala Val Gly
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Asp Ser Ala Tyr Ser Thr Gly His Val Ser Arg Leu Ser Pro Leu
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Ser Val Asp Thr Val Ala Val Gly Leu Val Ser Ser Val Val Val
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Tyr Pro Val Tyr Leu Ala Ile Leu Phe Leu Phe Arg Met Ser Arg
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Ser Lys Val Ala Gly Ser Pro Ser Pro Thr Pro Ala Gly Gln Gln
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Val Leu Asp Ile Asp Ser Cys Leu Asp Ser Ser Val Leu Asp Ser
3365   3370   3375

Ser Phe Leu Thr Phe Ser Gly Leu His Ala Glu Gln Ala Phe Val
3380   3385   3390

Gly Gln Met Lys Ser Asp Leu Phe Leu Asp Asp Ser Lys Ser Leu
3395   3400   3405

Val Cys Trp Pro Ser Gly Glu Gly Thr Leu Ser Trp Pro Asp Leu
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Leu Ser Asp Pro Ser Ile Val Gly Ser Asn Leu Arg Gln Leu Ala
3425   3430   3435

```
Arg Gly  Gln Ala Gly His Gly  Leu Gly Pro Glu Glu  Asp Gly Phe
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```
Ser Leu  Ala Ser Pro Tyr Ser  Pro Ala Lys Ser Phe  Ser Ala Ser
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```

```
Asp Glu  Asp Leu Ile Gln Gln  Val Leu Ala Glu Gly  Val Ser Ser
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```
Pro Ala  Pro Thr Gln Asp Thr  His Met Glu Thr Asp  Leu Leu Ser
    3485             3490             3495
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Ser Leu  Ser Ser Thr Pro Gly  Glu Lys Thr Glu Thr  Leu Ala Leu
    3500             3505             3510
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Gln Arg  Leu Gly Glu Leu Gly  Pro Pro Ser Pro Gly  Leu Asn Trp
    3515             3520             3525
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Glu Gln  Pro Gln Ala Ala Arg  Leu Ser Arg Thr Gly  Leu Val Glu
    3530             3535             3540
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Gly Leu  Arg Lys Arg Leu Leu  Pro Ala Trp Cys Ala  Ser Leu Ala
    3545             3550             3555
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His Gly  Leu Ser Leu Leu Leu  Val Ala Val Ala Val  Ala Val Ser
    3560             3565             3570
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Gly Trp  Val Gly Ala Ser Phe  Pro Pro Gly Val Ser  Val Ala Trp
    3575             3580             3585
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Leu Leu  Ser Ser Ser Ala Ser  Phe Leu Ala Ser Phe  Leu Gly Trp
    3590             3595             3600
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Glu Pro  Leu Lys Val Leu Leu  Glu Ala Leu Tyr Phe  Ser Leu Val
    3605             3610             3615
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Ala Lys  Arg Leu His Pro Asp  Glu Asp Asp Thr Leu  Val Glu Ser
    3620             3625             3630
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Pro Ala  Val Thr Pro Val Ser  Ala Arg Val Pro Arg  Val Arg Pro
    3635             3640             3645
```

```
Pro His  Gly Phe Ala Leu Phe  Leu Ala Lys Glu Glu  Ala Arg Lys
    3650             3655             3660
```

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Val Lys  Arg Leu His Gly Met  Leu Arg Ser Leu Leu  Val Tyr Met
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Leu Phe  Leu Leu Val Thr Leu  Leu Ala Ser Tyr Gly  Asp Ala Ser
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Cys His  Gly His Ala Tyr Arg  Leu Gln Ser Ala Ile  Lys Gln Glu
        3695                        3700                        3705

Leu His  Ser Arg Ala Phe Leu  Ala Ile Thr Arg Ser  Glu Glu Leu
        3710                        3715                        3720

Trp Pro  Trp Met Ala His Val  Leu Leu Pro Tyr Val  His Gly Asn
        3725                        3730                        3735

Gln Ser  Ser Pro Glu Leu Gly  Pro Pro Arg Leu Arg  Gln Val Arg
        3740                        3745                        3750

Leu Gln  Glu Ala Leu Tyr Pro  Asp Pro Pro Gly Pro  Arg Val His
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Thr Cys  Ser Ala Ala Gly Gly  Phe Ser Thr Ser Asp  Tyr Asp Val
        3770                        3775                        3780

Gly Trp  Glu Ser Pro His Asn  Gly Ser Gly Thr Trp  Ala Tyr Ser
        3785                        3790                        3795

Ala Pro  Asp Leu Leu Gly Ala  Trp Ser Trp Gly Ser  Cys Ala Val
        3800                        3805                        3810

Tyr Asp  Ser Gly Gly Tyr Val  Gln Glu Leu Gly Leu  Ser Leu Glu
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Glu Ser  Arg Asp Arg Leu Arg  Phe Leu Gln Leu His  Asn Trp Leu
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Asp Asn  Arg Ser Arg Ala Val  Phe Leu Glu Leu Thr  Arg Tyr Ser
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Pro Ala  Val Gly Leu His Ala  Ala Val Thr Leu Arg  Leu Glu Phe
        3860                        3865                        3870

Pro Ala  Ala Gly Arg Ala Leu  Ala Ala Leu Ser Val  Arg Pro Phe
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Ala Leu  Arg Arg Leu Ser Ala  Gly Leu Ser Leu Pro  Leu Leu Thr
        3890                        3895                        3900
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Ser Val Cys Leu Leu Leu Phe Ala Val His Phe Ala Val Ala Glu
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Ala Arg Thr Trp His Arg Glu Gly Arg Trp Arg Val Leu Arg Leu
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Gly Ala Trp Ala Arg Trp Leu Leu Val Ala Leu Thr Ala Ala Thr
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Ala Leu Val Arg Leu Ala Gln Leu Gly Ala Ala Asp Arg Gln Trp
    3950   3955   3960

Thr Arg Phe Val Arg Gly Arg Pro Arg Arg Phe Thr Ser Phe Asp
    3965   3970   3975

Gln Val Ala His Val Ser Ser Ala Ala Arg Gly Leu Ala Ala Ser
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Leu Leu Phe Leu Leu Leu Val Lys Ala Ala Gln His Val Arg Phe
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Val Arg Gln Trp Ser Val Phe Gly Lys Thr Leu Cys Arg Ala Leu
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Pro Glu Leu Leu Gly Val Thr Leu Gly Leu Val Val Leu Gly Val
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Ala Tyr Ala Gln Leu Ala Ile Leu Leu Val Ser Ser Cys Val Asp
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Ser Leu Trp Ser Val Ala Gln Ala Leu Leu Val Leu Cys Pro Gly
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Thr Gly Leu Ser Thr Leu Cys Pro Ala Glu Ser Trp His Leu Ser
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Pro Leu Leu Cys Val Gly Leu Trp Ala Leu Arg Leu Trp Gly Ala
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Leu Arg Leu Gly Ala Val Ile Leu Arg Trp Arg Tyr His Ala Leu
    4100   4105   4110

Arg Gly Glu Leu Tyr Arg Pro Ala Trp Glu Pro Gln Asp Tyr Glu
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Met Val  Glu Leu Phe Leu Arg  Arg Leu Arg Leu Trp  Met Gly Leu
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Ser Lys  Val Lys Glu Phe Arg  His Lys Val Arg Phe  Glu Gly Met
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Glu Pro  Leu Pro Ser Arg Ser  Ser Arg Gly Ser Lys  Val Ser Pro
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Asp Val  Pro Pro Pro Ser Ala  Gly Ser Asp Ala Ser  His Pro Ser
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Thr Ser  Ser Ser Gln Leu Asp  Gly Leu Ser Val Ser  Leu Gly Arg
    4190                 4195                 4200


Leu Gly  Thr Arg Cys Glu Pro  Glu Pro Ser Arg Leu  Gln Ala Val
    4205                 4210                 4215


Phe Glu  Ala Leu Leu Thr Gln  Phe Asp Arg Leu Asn  Gln Ala Thr
    4220                 4225                 4230


Glu Asp  Val Tyr Gln Leu Glu  Gln Gln Leu His Ser  Leu Gln Gly
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Arg Arg  Ser Ser Arg Ala Pro  Ala Gly Ser Ser Arg  Gly Pro Ser
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Pro Gly  Leu Arg Pro Ala Leu  Pro Ser Arg Leu Ala  Arg Ala Ser
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Arg Gly  Val Asp Leu Ala Thr  Gly Pro Ser Arg Thr  Pro Leu Arg
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Ala Lys  Asn Lys Val His Pro  Ser Ser Thr
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            20                  25                  30

Ile Phe Thr Lys Leu Leu Gln Asp Asn Leu Pro Ala His Trp Met Lys
            35                  40                  45

Lys Ser Asn Phe Phe Val Leu Leu Leu Leu Ala Ile Ser Ala Ile Gln
            50                  55                  60

Ile Asp Gly Leu His Tyr Gln Leu Leu Asp Gly Ile Ala Thr Phe Arg
65                  70                  75                  80

Leu Asp Asn Asp Asp Thr Thr Ile Gly Gly Val Pro Arg Asn Ser Gln
                85                  90                  95

Gly Val Val Lys Ile Lys Leu Ser Cys Gly Leu Asn Arg Leu Ser Val
            100                 105                 110

Glu Asn Lys Val Thr Glu Val Ser Ser Leu Glu Leu Ile His Asn Cys
            115                 120                 125

Ile Gln Thr Glu Thr Arg Leu Val Gly Leu Phe Leu Asn Ser Thr Trp
    130                 135                 140

Ile Thr Leu Asn Glu Val Asn Asp Asp Asp Glu Ile Ser Ile Ala Val
145                 150                 155                 160

Glu Ala Lys Tyr Glu Val Cys Tyr Asp Asp Gly Ile Asp Arg Cys Asp
                165                 170                 175

Gly Ser Leu Trp Trp Leu Gln Val Gly Gly Asn Glu Met Ala Leu Leu
            180                 185                 190

Gly Tyr Arg Glu Lys Cys Glu Ser Gly Glu Ile Asn Glu Glu Tyr Ala
            195                 200                 205

Arg Arg Met Cys Lys Arg Pro Tyr Arg Ser Glu Lys Ser Thr Ala Ile
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Ser Asp Ser Gln Gly Val Tyr Tyr Asp Gly Gln Val Leu Lys Gly Val
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Arg Ala Lys Gln Phe Ser Met Arg Thr Ser Gly Ser Pro Thr Leu Arg
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Arg Met Lys Arg Asp Ala Gly Asp Asn Thr Cys Asp Tyr Thr Ile Glu
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Thr Val Thr Ser Thr Thr Thr Val Pro Thr Ser Thr Ser Thr Val Thr
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Thr Ala Met Ser Thr Ser Thr Ser Thr Pro Ser Thr Ser Thr Thr Ile
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Glu Ser Thr Ser Thr Thr Phe Thr Ser Thr Ala Ser Thr Ser Thr Ser
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Ser Thr Ser Thr Thr Gln Gln Ser Ser Ser Thr Ile Thr Ser Ser Pro
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Ser Ser Thr Thr Leu Ser Thr Ser Ile Pro Thr Thr Thr Thr Pro Glu
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Ile Thr Ser Thr Leu Ser Ser Leu Pro Asp Asn Ala Ile Cys Ser Tyr
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Leu Asp Glu Thr Thr Thr Ser Thr Thr Phe Thr Thr Thr Met Leu Thr
385   390   395   400

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Thr Ser Thr Ser Ser Thr Val Thr Thr Thr Glu Pro Thr Thr Thr Leu
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Leu Gly Ile Ile Gly Tyr Gln Thr Ser Ile Glu Cys Thr Ser Pro Thr
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Ser Ser Asn Tyr Val Ser Thr Thr Lys Asp Gly Ala Cys Phe Thr Lys
            595   600   605

Ser Val Ser Met Pro Arg Leu Gly Gly Thr Tyr Pro Ala Ser Thr Phe
    610   615   620

Val Gly Pro Gly Asn Tyr Thr Phe Arg Ala Thr Met Thr Thr Asp Asp
625   630   635   640

Lys Lys Val Tyr Tyr Thr Tyr Ala Asn Val Tyr Ile Gln Glu Tyr Ser
            645   650   655

Ser Thr Thr Ile Glu Ser Glu Ser Ser Thr Ser Ala Val Ala Ser Ser
            660   665   670

Thr Ser Ser Thr Pro Ser Thr Pro Ser Ser Thr Leu Ser Thr Ser Thr
        675   680   685

Val Thr Glu Pro Ser Ser Thr Arg Ser Ser Asp Ser Thr Thr Thr Ser
    690   695   700

Ala Gly Ser Thr Thr Thr Leu Gln Glu Ser Thr Thr Thr Ser Glu Glu
705   710   715   720

Ser Thr Thr Asp Ser Ser Thr Thr Thr Ile Ser Asp Thr Ser Thr Ser
            725   730   735

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Thr Ser Ser Pro Ser Ser Thr Thr Ala Asp Ser Thr Ser Thr Leu Ser
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Thr Arg His Asn Glu Asp Ser Ile Asn Ile Val Pro Leu Pro Thr Asn
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Ala Ile Thr Pro Thr Glu Arg Ser Gln Thr Phe Glu Cys Arg Asn Val
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Ser Thr Glu Pro Phe Leu Ile Ile Lys Glu Ser Thr Cys Leu Asn Tyr
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Ser Asn Thr Val Leu Asn Ala Thr Tyr Ser Ser Asn Ile Pro Ile Gln
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Pro Ile Glu Thr Phe Leu Val Gly Ile Gly Thr Tyr Glu Phe Arg Ile
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Asn Met Thr Asp Leu Thr Thr Met Gln Val Val Ser His Ile Phe Thr
            850             855                 860

Leu Asn Val Val Ala Asp Ser Thr Ser Thr Ser Glu Val Thr Ser Thr
865                 870                 875                 880

Thr Ser Thr Gly Ser Ser Ser Glu Ser Ser Ala Ile Ser Thr Thr Ser
            885                 890                 895

Gly Ile Glu Ser Thr Ser Thr Leu Glu Ala Ser Thr Thr Asp Ala Ser
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Gln Asp Ser Ser Thr Ser Thr Ser Asp Ser Gly Thr Thr Ser Asp Ser
            915             920                 925

Thr Thr Ile Asp Ser Ser Asn Ser Thr Pro Ser Thr Ser Asp Ser Ser
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Gly Leu Ser Gln Thr Pro Ser Asp Ser Ser Ser Ala Ser Asp Ser Met
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Arg Thr Thr Thr Val Asp Pro Asp Ala Ser Thr Glu Thr Pro Tyr Asp
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Phe Val Leu Glu Asn Leu Thr Trp Asn Glu Thr Val Tyr Tyr Ser Glu
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         Asn Gly Ala Tyr Ser Ala Ser  Val Ser Phe Asn Pro  Met Thr Ser
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         Phe Val Pro Ala Thr Gly Thr  Tyr Glu Phe Leu Ile  Asn Val Thr
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         Asn Arg Ala Ser Gly Glu Ser  Ala Ser His Ile Phe  Thr Met Asn
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         Val Val Leu Pro Thr Thr Thr  Thr Glu Thr Pro Pro  Thr Thr Val
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         Thr Ala Ser Gly Ser Gly Ser  Gly Gly Ser Ser Gly  Thr Gly Ser
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         Thr Gly Ser Gly Thr Ala Thr  Thr Pro Gly Ser His  Leu Gly Asp
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         Gly Gly Ser Thr Ser Gly Ser  Gly Ser Asp Ser Asn  Gly Ser Ser
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Pro Ser  Thr Arg Thr Thr Lys  Thr Arg Ser Ser Leu  Ala Thr Val
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Ser Pro  Ile Ser Ala Ala Glu  Gln Ala Ile Ile Asp  Ala Gln Lys
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Ala Asp  Val Met Asn Gln Leu  Ala Gly Ile Met Asp  Gly Ser Ala
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Ser Asn  Asn Ser Leu Asn Thr  Ser Ser Ser Leu Leu  Asn Gln Ile
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Val Asp  Val Leu Lys Thr Leu  Gln Asp Asn Ile Ala  Thr Thr Asn
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Val Ser  Ser Thr Lys Ser Lys  Asp Gly Thr Tyr Ala  Val Ile Phe
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Ile Ser Thr Leu Ser Pro Thr Ala Ser Tyr Thr Lys Asp Asp Leu
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Gln Ser Leu Ile Lys Glu Gln Thr Leu Val Thr Val Ser Gly Thr
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Thr Ser Asn Ser Leu Leu Ser Ile Ala Gly Ser Leu Thr Ser Ala
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Leu Lys Ile Ala Leu Asp Asn Pro Leu Ser Ser Asp Leu Ala Ala
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Asn Leu Lys Tyr Ala Thr Asp Asn Tyr Asp Ser Leu Tyr Asn Val
1745   1750   1755

Leu Pro Ser Asp Pro Asp Asn Ile Val Tyr Val Glu Glu Met Thr
1760   1765   1770

Ser Glu Glu Trp Ala Ala Tyr Val Thr Lys Met Phe Gln Lys Asn
1775   1780   1785

Ile Ala Lys Asn Leu Ala Asn Gln Leu Ala Ser Thr Leu Asp Thr
1790   1795   1800

Leu Glu Asn Thr Leu Ala Ala Arg Ala Ile Ala Thr Gly Asn Leu
1805   1810   1815

Pro Tyr Asp Tyr Ser Asn Ser Val Asp Gly Thr Gly Met Val Ile
1820   1825   1830

Val Ile Asp Asp Ala Ser Asn Ile Val Gly Lys Thr Gln Asn Cys
1835   1840   1845

Glu Glu Trp Ala Phe Lys Leu Pro Ser Pro Ala Ser Thr Leu Asn
1850   1855   1860

Thr Ala Glu Ile Thr Asp Lys Thr Leu Ile Gln Val Gly Leu Val
1865   1870   1875

Cys Tyr Ala Thr Asn Pro Arg Thr Tyr Val Asp Asn Phe Asp Met
1880   1885   1890

Leu Ile Thr Ser Gly Ala Leu Glu Ala His Ile Lys Asp Glu Asn

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        1895                    1900                    1905


Gln Ile  Ile Ile Pro Ile Thr  Gly Thr Thr Ala Pro  Ile Tyr Val
    1910                   1915                   1920


Asn Gly  Arg Gly Ser Glu Asp  Asp Ala Val Leu Thr  Leu Met Gln
    1925                   1930                   1935


Gln Gly  Asp Phe Ala Ser Tyr  Gln Ile Leu Asp Leu  His Ala Phe
    1940                   1945                   1950


Arg Thr  Thr Asn Trp Asn Asn  Ser Leu Gln Val Glu  Ile Ile Ala
    1955                   1960                   1965


Ser Gln  Asp Tyr Glu Ile Pro  Asn Asn Asp Asp Thr  Tyr Met Phe
    1970                   1975                   1980


Ser Ser  Phe Gln Ser Leu Pro  Gly Pro Leu Glu Ser  Asn His Glu
    1985                   1990                   1995


Trp Ile  Phe Asp Leu Asn Thr  Leu Asn Lys Thr Ser  Asn Tyr Phe
    2000                   2005                   2010


Val Thr  Ala Gly Asn Leu Ile  Asn Asn Thr Gly Leu  Phe Phe Ile
    2015                   2020                   2025


Gly Ile  Gly Lys Arg Asn Ser  Ser Thr Asn Thr Gly  Asn Ser Ser
    2030                   2035                   2040


Asp Ile  Val Asn Tyr Gly Gln  Tyr Asp Ser Met Gln  Trp Ser Phe
    2045                   2050                   2055


Ala Arg  Ser Val Pro Met Asp  Tyr Gln Val Ala Ala  Val Ser Lys
    2060                   2065                   2070


Gly Cys  Tyr Phe Tyr Gln Lys  Thr Ser Asp Val Phe  Asn Ser Glu
    2075                   2080                   2085


Gly Met  Tyr Pro Ser Asp Gly  Gln Gly Met Gln Phe  Val Asn Cys
    2090                   2095                   2100


Ser Thr  Asp His Leu Thr Met  Phe Ser Val Gly Ala  Phe Asn Pro
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Thr Ile  Asp Ala Asp Phe Ser  Tyr Asn Tyr Asn Val  Asn Glu Ile
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Glu Lys Asn Val Lys Val Met Ile Ala Ala Val Phe Met Leu Val
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Val Tyr Gly Cys Leu Thr Ile Asn Ala Ile Ile Cys Gln Arg Lys
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Asp Ala Ser Arg Gly Arg Leu Arg Phe Leu Lys Asp Asn Glu Pro
    2165   2170   2175

His Asp Gly Tyr Met Tyr Val Ile Ala Val Glu Thr Gly Tyr Arg
    2180   2185   2190

Met Phe Ala Thr Thr Asp Ser Thr Ile Cys Phe Asn Leu Ser Gly
    2195   2200   2205

Asn Glu Gly Asp Gln Ile Phe Arg Ser Phe Arg Ser Glu Glu Asp
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Gly Asn Trp Glu Phe Pro Phe Ser Trp Gly Thr Thr Asp Arg Phe
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Val Met Thr Thr Ala Phe Pro Leu Gly Glu Leu Glu Tyr Met Arg
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Leu Trp Leu Asp Asp Ala Gly Leu Asp His Arg Glu Ser Trp Tyr
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Cys Asn Arg Ile Ile Val Lys Asp Leu Gln Thr Gln Asp Ile Tyr
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Tyr Phe Pro Phe Asn Asn Trp Leu Gly Thr Lys Asn Gly Asp Gly
    2285   2290   2295

Glu Thr Glu Arg Leu Ala Arg Val Glu Tyr Lys Arg Arg Phe Leu
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Asp Glu Ser Met Ser Met His Met Leu Ala Gln Thr Ile Ser Trp
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Phe Ala Met Phe Thr Gly Gly Gly Asn Arg Leu Arg Asp Arg Val
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Ser Arg Gln Asp Tyr Ser Val Ser Ile Ile Phe Ser Leu Val Val
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Val Ser Met Ile Ser Ile Thr Ile Leu Lys Ser Asp Asn Ser Ile
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Ile Ser Asp Ser Lys Ser Val Ser Glu Phe Thr Phe Thr Ile Lys
2375   2380   2385

Asp Ile Ala Phe Gly Val Gly Phe Gly Val Leu Ile Thr Phe Leu
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Asn Ser Leu His Ile Leu Leu Cys Thr Lys Cys Arg Ser His Ser
2405   2410   2415

Glu His Tyr Tyr Tyr Lys Lys Arg Lys Arg Glu Asp Pro Glu Phe
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Lys Asp Asn Ser Gly Ser Trp Pro Met Phe Met Ala Gly Met Ala
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Arg Thr Ile Ile Val Phe Pro Val Leu Met Gly Leu Ile Tyr Ile
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Ser Gly Ala Gly Met Ser Leu Met Asp Asp Leu Ala Asn Ser Phe
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Tyr Ile Arg Phe Leu Ile Ser Leu Ile Leu Trp Ala Val Val Phe
2480   2485   2490

Glu Pro Ile Lys Gly Leu Ile Trp Ala Phe Leu Ile Leu Lys Thr
2495   2500   2505

Arg Lys Ser His Lys Ile Ile Asn Lys Leu Glu Glu Ala Leu Leu
2510   2515   2520

Arg Ala Lys Pro Ala Glu Thr Phe Leu Arg Asn Pro Tyr Gly Lys
2525   2530   2535

Ile Glu Lys Gly Leu Gly Thr Glu Ile Ala Asp Val Thr Lys Leu
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Arg Asp Thr Glu Asn Arg Lys Met Arg Asp Glu Gln Leu Phe Ile
2555   2560   2565

Thr Ile Arg Asp Met Leu Cys Phe Phe Ala Ser Leu Tyr Ile Met
2570   2575   2580

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Gln Leu  Glu Met Ser Thr Ile  Leu Asn Ile Asn Gln  Lys Asn Tyr
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Gly Asp  Asn Thr Phe Met Ser  Ile Gln His Ala Asp  Asp Phe Trp
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Asp Trp  Ala Arg Glu Ser Leu  Ala Thr Ala Leu Leu  Ala Ser Trp
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Tyr Asp  Gly Asn Pro Ala Tyr  Gly Met Arg Ala Tyr  Met Asn Asp
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Lys Val  Ser Arg Ser Met Gly  Ile Gly Thr Ile Arg  Gln Val Arg
    2660             2665             2670

Thr Lys  Lys Ser Ala Glu Cys  Thr Met Phe Lys Gln  Phe Gln Gly
    2675             2680             2685

Tyr Ile  Asn Asp Cys Gly Glu  Glu Leu Thr Ser Lys  Asn Glu Glu
    2690             2695             2700

Lys Thr  Leu Tyr Met Gln Ala  Gly Trp Thr Glu Leu  Glu Ser Glu
    2705             2710             2715

Asn Gly  Thr Asp Ala Ser Asp  Glu Tyr Thr Tyr Lys  Thr Ser Glu
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Glu Leu  Ser Thr Glu Thr Val  Ser Gly Leu Leu Tyr  Ser Tyr Ser
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Gly Gly  Gly Tyr Thr Ile Ser  Met Ser Gly Thr Gln  Ala Glu Ile
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Ile Thr  Leu Phe Asn Lys Leu  Asp Ser Glu Arg Trp  Ile Asp Asp
    2765             2770             2775

His Thr  Arg Ala Val Ile Ile  Glu Phe Ser Ala Tyr  Asn Ala Gln
    2780             2785             2790

Ile Asn  Tyr Phe Ser Val Val  Gln Leu Leu Val Glu  Ile Pro Lys
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Ser Gly  Ile Tyr Leu Pro Asn  Ser Trp Val Glu Ser  Val Arg Leu
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   Ile Lys  Ser Glu Gly Ser Asp  Gly Thr Val Val Lys  Tyr Tyr Glu
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   Met Leu  Tyr Ile Phe Phe Ser  Val Leu Ile Phe Val  Lys Glu Ile
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   Val Phe  Tyr Leu Tyr Gly Arg  Tyr Lys Val Ile Thr  Thr Met Lys
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   Pro Thr  Arg Asn Pro Phe Lys  Ile Val Tyr Gln Leu  Ala Leu Gly
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   Asn Phe  Ser Pro Trp Asn Phe  Met Asp Leu Ile Val  Gly Ala Leu
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   Ala Val  Ala Ser Val Leu Ala  Tyr Thr Ile Arg Gln  Arg Thr Thr
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   Asn Arg  Ala Met Glu Asp Phe  Asn Ala Asn Asn Gly  Asn Ser Tyr
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   Ile Asn  Leu Thr Glu Gln Arg  Asn Trp Glu Ile Val  Phe Ser Tyr
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   Cys Leu  Ala Gly Ala Val Phe  Phe Thr Ser Cys Lys  Met Ile Arg
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   Ile Leu  Arg Phe Asn Arg Arg  Ile Gly Val Leu Ala  Ala Thr Leu
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   Asp Asn  Ala Leu Gly Ala Ile  Val Ser Phe Gly Ile  Ala Phe Leu
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   Phe Phe  Ser Met Thr Phe Asn  Ser Val Leu Tyr Ala  Val Leu Gly
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   Asn Lys  Met Gly Gly Tyr Arg  Ser Leu Met Ala Thr  Phe Gln Thr
         3005                      3010                      3015


   Ala Leu  Ala Gly Met Leu Gly  Lys Leu Asp Val Thr  Ser Ile Gln
         3020                      3025                      3030


   Pro Ile  Ser Gln Phe Ala Phe  Val Val Ile Met Leu  Tyr Met Ile
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Ala Gly  Ser Lys Leu Val Leu  Gln Leu Tyr Val Thr  Ile Ile Met
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Phe Glu  Phe Glu Glu Ile Arg  Asn Asp Ser Glu Lys  Gln Thr Asn
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Asp Tyr  Glu Ile Ile Asp His  Ile Lys Tyr Lys Thr  Lys Arg Arg
    3080             3085             3090


Leu Gly  Leu Leu Glu Pro Lys  Asp Phe Ala Pro Val  Ser Ile Ala
    3095             3100             3105


Asp Thr  Gln Lys Asp Phe Arg  Leu Phe His Ser Ala  Val Ala Lys
    3110             3115             3120


Val Asn  Leu Leu His His Arg  Ala Thr Arg Met Leu  Gln Thr Gln
    3125             3130             3135


Gly Gln  Tyr Gln Asn Gln Thr  Val Ile Asn Tyr Thr  Leu Ser Tyr
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Asp Pro  Val Ser Ala Ile His  Glu Thr Gly Pro Lys  Arg Phe Gln
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tatcttctcc ctcttcatcc ataatgtatg cccctcttca aatggaaaat atgatgtcgg    8040

ggggaggtcc tcccactccc cacgaccctc cat                                 8073
```

<210> 6
<211> 815
<212> PRT
<213> C. Elegans Pkd-2 protein

<400> 6

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Met Glu Gly Arg Gly Glu Gly Glu Asp Leu Pro Pro Thr Ser Tyr Phe
1               5                   10                  15

Pro Phe Glu Glu Gly His Thr Leu Trp Met Lys Arg Glu Lys Ile Lys
                20                  25                  30

His Leu Gln Arg Ile Leu Gln Phe His Ser Asp Glu Ser Ile Leu Met
            35                  40                  45

Ile Asp Lys Lys Leu Met Ile Ser Gly Gly Leu Glu Pro Pro Thr Phe
        50                  55                  60

Cys Val Leu Asp Arg Cys Asp Asn His Tyr Thr Thr Lys Pro Arg His
65                  70                  75                  80

Leu Pro Pro Phe Glu Val Phe Leu Phe Val Val Ile Phe Lys Cys Glu
                85                  90                  95

Pro Ser Ser Met Asn Tyr Gly Ala Ala Asp Glu Arg Trp Ala Asn Pro
                100                 105                 110

Pro Gln Pro Val Ala Ala Ala Glu His Gly Pro Ser Phe Asp His Ser
            115                 120                 125

Met Val Ser Glu Glu Tyr Glu His Asp Lys Lys Lys Asn Pro Ala Gln
        130                 135                 140

Lys Glu Gly Ile Ser Phe Ser Gln Ala Leu Leu Ala Ser Gly His Glu
145                 150                 155                 160

Lys Ser Asp Gly Lys Ile Lys Leu Thr Ala Arg Ser Phe Met Glu Val
                165                 170                 175
```

Gly Gly Tyr Ala Val Phe Leu Ile Val Leu Val Tyr Val Ala Phe Ala
          180   185   190

Gln Asn Ser Ile Gln Ser Tyr Tyr Tyr Ser Lys Val Met Ser Asp Leu
          195   200   205

Phe Val Ala Ser Thr Gly Ala Ser Gly Ala Pro Ala Phe Gly Ser Cys
          210   215   220

Thr Ser Met Asp Asn Ile Trp Asp Trp Leu Ser Gln Val Leu Ile Pro
225   230   235   240

Gly Ile Tyr Trp Thr Glu Thr Ser Asn Ser Thr Asp Asn Glu Asn Met
              245   250   255

Ile Tyr Tyr Glu Asn Arg Leu Leu Gly Glu Pro Arg Ile Arg Met Leu
          260   265   270

Lys Val Thr Asn Asp Ser Cys Thr Val Met Lys Ser Phe Gln Arg Glu
          275   280   285

Ile Lys Glu Cys Phe Ala Asn Tyr Glu Glu Lys Leu Glu Asp Lys Thr
          290   295   300

Met Val Gly Asp Gly Ser Val Asp Ala Phe Ile Tyr Ala Thr Ala Lys
305   310   315   320

Glu Leu Glu Asn Leu Lys Thr Val Gly Thr Ile Ala Ser Tyr Gly Gly
              325   330   335

Gly Gly Phe Val Gln Arg Leu Pro Val Ala Gly Ser Thr Glu Ala Gln
          340   345   350

Ser Ala Ile Ala Thr Leu Lys Ala Asn Arg Trp Ile Asp Arg Gly Ser
          355   360   365

Arg Ala Ile Ile Val Asp Phe Ala Leu Tyr Asn Ala Asn Ile Asn Leu
          370   375   380

Phe Cys Val Val Lys Leu Leu Phe Glu Leu Pro Ala Ser Gly Gly Val
385   390   395   400

Ile Thr Thr Pro Lys Leu Met Thr Tyr Asp Leu Leu Thr Tyr Gln Thr
          405   410   415

Ser Gly Gly Thr Arg Met Met Ile Phe Glu Gly Ile Phe Cys Gly Phe

420   425   430

Ile Leu Tyr Phe Ile Phe Glu Glu Leu Phe Ala Ile Gly Arg His Arg
  435   440   445

Leu His Tyr Leu Thr Gln Phe Trp Asn Leu Val Asp Val Val Leu Leu
  450   455   460

Gly Phe Ser Val Ala Thr Ile Ile Leu Ser Val Asn Arg Thr Lys Thr
465   470   475   480

Gly Val Asn Arg Val Asn Ser Val Ile Glu Asn Gly Leu Thr Asn Ala
      485   490   495

Pro Phe Asp Asp Val Thr Ser Ser Glu Asn Ser Tyr Leu Asn Ile Lys
    500   505   510

Ala Cys Val Val Phe Val Ala Trp Val Lys Val Phe Lys Phe Ile Ser
    515   520   525

Val Asn Lys Thr Met Ser Gln Leu Ser Ser Thr Leu Thr Arg Ser Ala
  530   535   540

Lys Asp Ile Gly Gly Phe Ala Val Met Phe Ala Val Phe Phe Phe Ala
545   550   555   560

Phe Ala Gln Phe Gly Tyr Leu Cys Phe Gly Thr Gln Ile Ala Asp Tyr
      565   570   575

Ser Asn Leu Tyr Asn Ser Ala Phe Ala Leu Leu Arg Leu Ile Leu Gly
    580   585   590

Asp Phe Asn Phe Ser Ala Leu Glu Ser Cys Asn Arg Phe Phe Gly Pro
    595   600   605

Ala Phe Phe Ile Ala Tyr Val Phe Phe Val Ser Phe Ile Leu Leu Asn
    610   615   620

Met Phe Leu Ala Ile Ile Asn Asp Ser Tyr Val Glu Val Lys Ala Glu
625   630   635   640

Leu Ala Arg Lys Lys Asp Gly Glu Gly Ile Leu Asp Trp Phe Met Asn
      645   650   655

Lys Val Arg Gly Leu Thr Lys Arg Gly Lys Arg Pro Asp Ala Pro Gly
    660   565   670

Glu Asp Ala Thr Tyr Glu Asp Tyr Lys Leu Met Leu Tyr Arg Ala Gly
        675   680   685

Tyr Ala Glu Lys Asp Ile Asn Glu Ala Phe Thr Arg Phe Asn Val Thr
        690   695   700

Ser Met Thr Glu His Val Pro Glu Lys Val Ala Glu Asp Ile Ala Asp
705   710   715   720

Glu Val Ala Arg Met Thr Glu Gln Lys Arg Asn Tyr Met Glu Asn His
                725   730   735

Arg Asp Tyr Ala Asn Leu Asn Arg Arg Val Asp Gln Met Gln Glu Ser
            740   745   750

Val Phe Ser Ile Val Asp Arg Ile Glu Gly Val Asn Ala Thr Leu Gln
        755   760   765

Thr Ile Glu Lys Gln Arg Val Gln Gln Gln Asp Gly Gly Asn Leu Met
    770   775   780

Asp Leu Ser Ala Leu Leu Thr Asn Gln Val Arg Asn Arg Glu Ser Ala
785   790   795   800

Ala Arg Arg Pro Thr Ile Thr Ser Ile Ala Asp Lys Lys Glu Glu
            805   810   815

<210> 7
<211> 22
<212> DNA
<213> Artificial sequence

<220>
<223> Description of Artificial Sequence: Outside primer for PCR
      screening of lov-1 genomic (sy582) deletion

<400> 7
ctctatttgt ggttcgttgg cg   22

<210> 8
<211> 22
<212> DNA
<213> Artificial sequence

<220>
<223> Description of Artificial Sequence: Outside primer for PCR
      screening of lov-1 genomic (sy582) deletion

<400> 8

gggagtttcc gttttcatgg gg   22

<210> 9
<211> 22
<212> DNA
<213> Artificial sequence

<220>
<223> Description of Artificial Sequence: Nested primer for PCR
       screening of lov-1 genomic (sy582) deletion

<400> 9
ctaggaccga tgcaacagcg ag   22

<210> 10
<211> 22
<212> DNA
<213> Artificial sequence

<220>
<223> Description of Artificial Sequence: Nested primer for PCR
       screening of lov-1 genomic (sy582) deletion

<400> 10
aacgctgatt ggttcaagtg tg   22

<210> 11
<211> 22
<212> DNA
<213> Artificial sequence

<220>
<223> Description of Artificial Sequence: Outside primer for PCR
       screening of pkd-2 genomic (sy606) deletion

<400> 11
cccctcgttt gaccattcta tgg   23

<210> 12
<211> 22
<212> DNA
<213> Artificial sequence

<220>
<223> Description of Artificial Sequence: Outside primer for PCR
       screening of pkd-2 genomic (sy606) deletion

<400> 12
acgtgatcct ctgtcgatcc ag   22

<210> 13
<211> 22
<212> DNA
<213> Artificial sequence

<220>

<223> Description of Artificial Sequence: Nested primer for PCR
     screening of pkd-2 genomic (sy606) deletion

<400> 13
agatcaagct gactgcccgt tc   22

<210> 14
<211> 23
<212> DNA
<213> Artificial sequence

<220>
<223> Description of Artificial Sequence: Nested primer for PCR
     screening of pkd-2 genomic (sy606) deletion

<400> 14
gatccagcga ttagccttta acg   23

<210> 15
<211> 2870
<212> PRT
<213> C. Elegans Lov-1 sy582 deletion protein

<400> 15

Met Val Leu Arg Phe Ser Pro Pro Phe Arg Phe Ser Thr Thr Ser Phe
1   5   10   15

Phe Ser Cys Cys Leu Phe Cys Ser Glu Phe Ile Phe Val Phe Arg Arg
            20   25   30

Ile Phe Thr Lys Leu Leu Gln Asp Asn Leu Pro Ala His Trp Met Lys
        35   40   45

Lys Ser Asn Phe Phe Val Leu Leu Leu Leu Ala Ile Ser Ala Ile Gln
    50   55   60

Ile Asp Gly Leu His Tyr Gln Leu Leu Asp Gly Ile Ala Thr Phe Arg
65   70   75   80

Leu Asp Asn Asp Asp Thr Thr Ile Gly Gly Val Pro Arg Asn Ser Gln
                85   90   95

Gly Val Val Lys Ile Lys Leu Ser Cys Gly Leu Asn Arg Leu Ser Val
            100   105   110

Glu Asn Lys Val Thr Glu Val Ser Ser Leu Glu Leu Ile His Asn Cys
            115   120   125

Ile Gln Thr Glu Thr Arg Leu Val Gly Leu Phe Leu Asn Ser Thr Trp
    130   135   140

```
Ile Thr Leu Asn Glu Val Asn Asp Asp Asp Glu Ile Ser Ile Ala Val
145             150             155                 160

Glu Ala Lys Tyr Glu Val Cys Tyr Asp Asp Gly Ile Asp Arg Cys Asp
                165             170                 175

Gly Ser Leu Trp Trp Leu Gln Val Gly Gly Asn Glu Met Ala Leu Leu
            180             185             190

Gly Tyr Arg Glu Lys Cys Glu Ser Gly Glu Ile Asn Glu Glu Tyr Ala
            195             200             205

Arg Arg Met Cys Lys Arg Pro Tyr Arg Ser Glu Lys Ser Thr Ala Ile
        210             215             220

Ser Asp Ser Gln Gly Val Tyr Tyr Asp Gly Gln Val Leu Lys Gly Val
225             230             235                 240

Arg Ala Lys Gln Phe Ser Met Arg Thr Ser Gly Ser Pro Thr Leu Arg
            245             250             255

Arg Met Lys Arg Asp Ala Gly Asp Asn Thr Cys Asp Tyr Thr Ile Glu
            260             265             270

Ser Thr Ser Thr Ser Thr Thr Thr Pro Thr Thr Thr Thr Val Thr Ser
        275             280             285

Thr Val Thr Ser Thr Thr Thr Val Pro Thr Ser Thr Ser Thr Val Thr
    290             295             300

Thr Ala Met Ser Thr Ser Thr Ser Thr Pro Ser Thr Ser Thr Thr Ile
305             310             315                 320

Glu Ser Thr Ser Thr Thr Phe Thr Ser Thr Ala Ser Thr Ser Thr Ser
            325             330             335

Ser Thr Ser Thr Thr Gln Gln Ser Ser Ser Thr Ile Thr Ser Ser Pro
        340             345             350

Ser Ser Thr Thr Leu Ser Thr Ser Ile Pro Thr Thr Thr Thr Pro Glu
        355             360             365

Ile Thr Ser Thr Leu Ser Ser Leu Pro Asp Asn Ala Ile Cys Ser Tyr
370             375             380
```

Leu Asp Glu Thr Thr Thr Ser Thr Thr Phe Thr Thr Thr Met Leu Thr
385   390   395   400

Ser Thr Thr Thr Glu Glu Pro Ser Thr Ser Thr Thr Thr Thr Glu Val
                405   410   415

Thr Ser Thr Ser Ser Thr Val Thr Thr Thr Glu Pro Thr Thr Thr Leu
            420   425   430

Thr Thr Ser Thr Ala Ser Thr Ser Thr Thr Glu Pro Ser Thr Ser Thr
        435   440   445

Val Thr Thr Ser Pro Ser Thr Ser Pro Val Thr Ser Thr Val Thr Ser
    450   455   460

Ser Ser Ser Ser Ser Thr Thr Val Thr Thr Pro Thr Ser Thr Glu Ser
465   470   475   480

Thr Ser Thr Ser Pro Ser Ser Thr Val Thr Thr Ser Thr Thr Ala Pro
            485   490   495

Ser Thr Ser Thr Thr Gly Pro Ser Ser Ser Ser Ser Thr Pro Ser Ser
        500   505   510

Thr Ala Ser Ser Ser Val Ser Ser Thr Ala Ser Ser Thr Gln Ser Ser
        515   520   525

Thr Ser Thr Gln Gln Ser Ser Thr Thr Thr Lys Ser Glu Thr Thr Thr
    530   535   540

Ser Ser Asp Gly Thr Asn Pro Asp Phe Tyr Phe Val Glu Lys Ala Thr
545   550   555   560

Thr Thr Phe Tyr Asp Ser Thr Ser Val Asn Leu Thr Leu Asn Ser Gly
            565   570   575

Leu Gly Ile Ile Gly Tyr Gln Thr Ser Ile Glu Cys Thr Ser Pro Thr
            580   585   590

Ser Ser Asn Tyr Val Ser Thr Thr Lys Asp Gly Ala Cys Phe Thr Lys
        595   600   605

Ser Val Ser Met Pro Arg Leu Gly Gly Thr Tyr Pro Ala Ser Thr Phe
    610   615   620

Val Gly Pro Gly Asn Tyr Thr Phe Arg Ala Thr Met Thr Thr Asp Asp
625   630   635   640

Lys Lys Val Tyr Tyr Thr Tyr Ala Asn Val Tyr Ile Gln Glu Tyr Ser
                645   650   655

Ser Thr Thr Ile Glu Ser Glu Ser Ser Thr Ser Ala Val Ala Ser Ser
                660   665   670

Thr Ser Ser Thr Pro Ser Thr Pro Ser Ser Thr Leu Ser Thr Ser Thr
                675   680   685

Val Thr Glu Pro Ser Ser Thr Arg Ser Ser Asp Ser Thr Thr Thr Ser
                690   695   700

Ala Gly Ser Thr Thr Thr Leu Gln Glu Ser Thr Thr Thr Ser Glu Glu
705   710   715   720

Ser Thr Thr Asp Ser Ser Thr Thr Thr Ile Ser Asp Thr Ser Thr Ser
                725   730   735

Thr Ser Ser Pro Ser Ser Thr Thr Ala Asp Ser Thr Ser Thr Leu Ser
                740   745   750

Val Asp Gln Phe Asp Phe Ile Leu Asp Ser Gly Leu Ser Trp Asn Glu
                755   760   765

Thr Arg His Asn Glu Asp Ser Ile Asn Ile Val Pro Leu Pro Thr Asn
770   775   780

Ala Ile Thr Pro Thr Glu Arg Ser Gln Thr Phe Glu Cys Arg Asn Val
785   790   795   800

Ser Thr Glu Pro Phe Leu Ile Ile Lys Glu Ser Thr Cys Leu Asn Tyr
                805   810   815

Ser Asn Thr Val Leu Asn Ala Thr Tyr Ser Ser Asn Ile Pro Ile Gln
                820   825   830

Pro Ile Glu Thr Phe Leu Val Gly Ile Gly Thr Tyr Glu Phe Arg Ile
                835   840   845

Asn Met Thr Asp Leu Thr Thr Met Gln Val Val Ser His Ile Phe Thr
850   855   860

Leu Asn Val Val Ala Asp Ser Thr Ser Thr Ser Glu Val Thr Ser Thr

865   870   875   880

Thr Ser Thr Gly Ser Ser Ser Glu Ser Ser Ala Ile Ser Thr Thr Ser
              885   890   895

Gly Ile Glu Ser Thr Ser Thr Leu Glu Ala Ser Thr Thr Asp Ala Ser
              900   905   910

Gln Asp Ser Ser Thr Ser Thr Ser Asp Ser Gly Thr Thr Ser Asp Ser
              915   920   925

Thr Thr Ile Asp Ser Ser Asn Ser Thr Pro Ser Thr Ser Asp Ser Ser
              930   935   940

Gly Leu Ser Gln Thr Pro Ser Asp Ser Ser Ser Ala Ser Asp Ser Met
945   950   955   960

Arg Thr Thr Thr Val Asp Pro Asp Ala Ser Thr Glu Thr Pro Tyr Asp
                    965   970   975

Phe Val Leu Glu Asn Leu Thr Trp Asn Glu Thr Val Tyr Tyr Ser Glu
              980   985   990

Asn Pro Phe Tyr Ile Thr Pro Ile Pro Asn Lys Glu Pro Gly Ala Leu
              995   1000   1005

Thr Thr Ala Met Thr Cys Gln Cys Arg Asn Asp Ser Ser Gln Pro
     1010   1015   1020

Phe Val Leu Leu Lys Glu Ser Asn Cys Leu Thr Glu Phe Gly Lys
     1025   1030   1035

Asn Gly Ala Tyr Ser Ala Ser Val Ser Phe Asn Pro Met Thr Ser
     1040   1045   1050

Phe Val Pro Ala Thr Gly Thr Tyr Glu Phe Leu Ile Asn Val Thr
     1055   1060   1065

Asn Arg Ala Ser Gly Glu Ser Ala Ser His Ile Phe Thr Met Asn
     1070   1075   1080

Val Val Leu Pro Thr Thr Thr Thr Glu Thr Pro Pro Thr Thr Val
     1085   1090   1095

Ser Ser Ser Asp Asp Ala Gly Gly Lys Thr Gly Gly Thr Gly Ala
     1100   1105   1110

Thr Gly Gly Thr Gly Gly Thr Gly Ser Gly Gly Ser Ala Thr Thr
    1115   1120   1125

Leu Ser Thr Gly Asp Ala Val Arg Ser Thr Thr Ser Gly Ser Gly
    1130   1135   1140

Ser Gly Gln Ser Ser Thr Gly Ser Gly Ala Gly Gly Ser Gly Thr
    1145   1150   1155

Thr Ala Ser Gly Ser Gly Ser Gly Gly Ser Ser Gly Thr Gly Ser
    1160   1165   1170

Asp Gly Val Asn Ser Gly Lys Thr Thr Ala Leu Asn Gly Asp Gly
    1175   1180   1185

Thr Gly Ser Gly Thr Ala Thr Thr Pro Gly Ser His Leu Gly Asp
    1190   1195   1200

Gly Gly Ser Thr Ser Gly Ser Gly Ser Asp Ser Asn Gly Ser Ser
    1205   1210   1215

Gly Val Ser Thr Lys Ser Ser Ser Gly Ser Asp Thr Ser Gly Ser
    1220   1225   1230

Ser Asp Ser Ser Gly Ala Asn Gly Ala Phe Ser Ala Thr Ala Gln
    1235   1240   1245

Pro Ser Thr Arg Thr Thr Lys Thr Arg Ser Ser Leu Ala Thr Val
    1250   1255   1260

Ser Pro Ile Ser Ala Ala Glu Gln Ala Ile Ile Asp Ala Gln Lys
    1265   1270   1275

Ala Asp Val Met Asn Gln Leu Ala Gly Ile Met Asp Gly Ser Ala
    1280   1285   1290

Ser Asn Asn Ser Leu Asn Thr Ser Ser Ser Leu Leu Asn Gln Ile
    1295   1300   1305

Ser Ser Leu Pro Ala Ala Asp Leu Val Glu Val Ala Gln Ser Leu
    1310   1315   1320

Leu Ser Asn Thr Leu Lys Ile Pro Gly Val Gly Asn Met Ser Ser
    1325   1330   1335

Val Asp Val Leu Lys Thr Leu Gln Asp Asn Ile Ala Thr Thr Asn
    1340   1345   1350

Ser Glu Leu Ala Asp Glu Met Ala Lys Val Ile Thr Lys Leu Ala
    1355   1360   1365

Asn Val Asn Met Thr Ser Ala Gln Ser Leu Asn Ser Val Leu Ser
    1370   1375   1380

Ser Leu Asp Leu Ala Leu Lys Gly Ser Thr Val Tyr Thr Leu Gly
    1385   1390   1395

Val Ser Ser Thr Lys Ser Lys Asp Gly Thr Tyr Ala Val Ile Phe
    1400   1405   1410

Gly Tyr Val Ile Ala Ser Gly Tyr Thr Leu Val Ser Pro Arg Cys
    1415   1420   1425

Thr Leu Ser Ile Tyr Gly Ser Thr Ile Tyr Leu Thr Gly Asp Thr
    1430   1435   1440

Arg Ala Ser Tyr Lys Gln Leu Asp Gly Asp Thr Val Thr Ala Asp
    1445   1450   1455

Thr Met Leu Ala Ala Ala Ile Gly Ile Gln Gly Met Phe Ala Thr
    1460   1465   1470

Asn Gly Arg Thr Val Gln Val Glu Gln Asp Lys Ile Asp Asp Lys
    1475   1480   1485

Arg Ser Leu Val Ser Gly Asn Ile Met Ala Thr Met Ser Gly Val
    1490   1495   1500

Gly Asp Val Gln Ser Gly Glu Tyr Ser Tyr Asn Asp Met Tyr Val
    1505   1510   1515

Thr Ala Trp Asn Val Thr Tyr Asp Asn Ser Thr Val Gly Ser Thr
    1520   1525   1530

Ser Gln Lys Asn Thr Ser Phe Ser Phe Asn Ile Pro Val Ser Glu
    1535   1540   1545

Val Gln Tyr Ile Leu Leu Ile Glu Ser Gly Thr Met Ile Lys Leu
    1550   1555   1560

His Ser Thr Gln Asn Ile Val Ser Arg Gly Leu Val Val Thr Ala
   1565   1570   1575

Ser Tyr Gly Gly Val Thr Tyr Thr Ile Thr Cys Thr Asn Gly Thr
   1580   1585   1590

Gly Lys Phe Val Glu Val Asp Thr Asp Asn Ala Ile Phe Ser Tyr
   1595   1600   1605

Asn Ala Asp Ser Phe Thr Val Val Ala Ser Asp Gly Ser Ser Ala
   1610   1615   1620

Ser Thr Val Lys Lys Leu Ile Gln Met Pro Ile Val Ile Glu Asn
   1625   1630   1635

Val Asn Leu Ala Leu Phe Asn Gln Thr Thr Ser Pro Leu Val Phe
   1640   1645   1650

Ser Asn Ala Gly Ser Tyr Ser Met Arg Met Val Leu Ser Pro Gln
   1655   1660   1665

Asp Ile Gly Ile Pro Ala Val Ser Ala Leu Ser Gln Thr Val Ser
   1670   1675   1680

Ile Ser Thr Leu Ser Pro Thr Ala Ser Tyr Thr Lys Asp Asp Leu
   1685   1690   1695

Gln Ser Leu Ile Lys Glu Gln Thr Leu Val Thr Val Ser Gly Thr
   1700   1705   1710

Thr Ser Asn Ser Leu Leu Ser Ile Ala Gly Ser Leu Thr Ser Ala
   1715   1720   1725

Leu Lys Ile Ala Leu Asp Asn Pro Leu Ser Ser Asp Leu Ala Ala
   1730   1735   1740

Asn Leu Lys Tyr Ala Thr Asp Asn Tyr Asp Ser Leu Tyr Asn Val
   1745   1750   1755

Leu Pro Ser Asp Pro Asp Asn Ile Val Tyr Val Glu Glu Met Thr
   1760   1765   1770

Ser Glu Glu Trp Ala Ala Tyr Val Thr Lys Met Phe Gln Lys Asn
   1775   1780   1785

Ile Ala Lys Asn Leu Ala Asn Gln Leu Ala Ser Thr Leu Asp Thr

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          1790                    1795                    1800


Leu Glu  Asn Thr Leu Ala Ala  Arg Ala Ile Ala Thr  Gly Asn Leu
     1805                    1810                    1815


Pro Tyr  Asp Tyr Ser Asn Ser  Val Asp Gly Thr Gly  Met Val Ile
     1820                    1825                    1830


Val Ile  Asp Asp Ala Ser Asn  Ile Val Gly Lys Thr  Gln Asn Cys
     1835                    1840                    1845


Glu Glu  Trp Ala Phe Lys Leu  Pro Ser Pro Ala Ser  Thr Leu Asn
     1850                    1855                    1860


Thr Ala  Glu Ile Thr Asp Lys  Thr Leu Ile Gln Val  Gly Leu Val
     1865                    1870                    1875


Cys Tyr  Ala Thr Asn Pro Arg  Thr Tyr Val Asp Asn  Phe Asp Met
     1880                    1885                    1890


Leu Ile  Thr Ser Gly Ala Leu  Glu Ala His Ile Lys  Asp Glu Asn
     1895                    1900                    1905


Gln Ile  Ile Ile Pro Ile Thr  Gly Thr Thr Ala Pro  Ile Tyr Val
     1910                    1915                    1920


Asn Gly  Arg Gly Ser Glu Asp  Asp Ala Val Leu Thr  Leu Met Gln
     1925                    1930                    1935


Gln Gly  Asp Phe Ala Ser Tyr  Gln Ile Leu Asp Leu  His Ala Phe
     1940                    1945                    1950


Arg Thr  Thr Asn Trp Asn Asn  Ser Leu Gln Val Glu  Ile Ile Ala
     1955                    1960                    1965


Ser Gln  Asp Tyr Glu Ile Pro  Asn Asn Asp Asp Thr  Tyr Met Phe
     1970                    1975                    1980


Ser Ser  Phe Gln Ser Leu Pro  Gly Pro Leu Glu Ser  Asn His Glu
     1985                    1990                    1995


Trp Ile  Phe Asp Leu Asn Thr  Leu Asn Lys Thr Ser  Asn Tyr Phe
     2000                    2005                    2010


Val Thr  Ala Gly Asn Leu Ile  Asn Asn Thr Gly Leu  Phe Phe Ile
     2015                    2020                    2025
```

Gly Ile Gly Lys Arg Asn Ser Ser Thr Asn Thr Gly Asn Ser Ser
2030   2035   2040

Asp Ile Val Asn Tyr Gly Gln Tyr Asp Ser Met Gln Trp Ser Phe
2045   2050   2055

Ala Arg Ser Val Pro Met Asp Tyr Gln Val Ala Ala Val Ser Lys
2060   2065   2070

Gly Cys Tyr Phe Tyr Gln Lys Thr Ser Asp Val Phe Asn Ser Glu
2075   2080   2085

Gly Met Tyr Pro Ser Asp Gly Gln Gly Met Gln Phe Val Asn Cys
2090   2095   2100

Ser Thr Asp His Leu Thr Met Phe Ser Val Gly Ala Phe Asn Pro
2105   2110   2115

Thr Ile Asp Ala Asp Phe Ser Tyr Asn Tyr Asn Val Asn Glu Ile
2120   2125   2130

Glu Lys Asn Val Lys Val Met Ile Ala Ala Val Phe Met Leu Val
2135   2140   2145

Val Tyr Gly Cys Leu Thr Ile Asn Ala Ile Ile Cys Gln Arg Lys
2150   2155   2160

Asp Ala Ser Arg Gly Arg Leu Arg Phe Leu Lys Asp Asn Glu Pro
2165   2170   2175

His Asp Gly Tyr Met Tyr Val Ile Ala Val Glu Thr Gly Tyr Arg
2180   2185   2190

Met Phe Ala Thr Thr Asp Ser Thr Ile Cys Phe Asn Leu Ser Gly
2195   2200   2205

Asn Glu Gly Asp Gln Ile Phe Arg Ser Phe Arg Ser Glu Glu Asp
2210   2215   2220

Gly Asn Trp Glu Phe Pro Phe Ser Trp Gly Thr Thr Asp Arg Phe
2225   2230   2235

Val Met Thr Thr Ala Phe Pro Leu Gly Glu Leu Glu Tyr Met Arg
2240   2245   2250

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Leu Trp  Leu Asp Asp Ala Gly  Leu Asp His Arg Glu  Ser Trp Tyr
    2255                 2260                  2265

Cys Asn  Arg Ile Ile Val Lys  Asp Leu Gln Thr Gln  Asp Ile Tyr
    2270                 2275                  2280

Tyr Phe  Pro Phe Asn Asn Trp  Leu Gly Thr Lys Asn  Gly Asp Gly
    2285                 2290                  2295

Glu Thr  Glu Arg Leu Ala Arg  Val Glu Tyr Lys Arg  Arg Phe Leu
    2300                 2305                  2310

Asp Glu  Ser Met Ser Met His  Met Leu Ala Gln Thr  Ile Ser Trp
    2315                 2320                  2325

Phe Ala  Met Phe Thr Gly Gly  Gly Asn Arg Leu Arg  Asp Arg Val
    2330                 2335                  2340

Ser Arg  Gln Asp Tyr Ser Val  Ser Ile Ile Phe Ser  Leu Val Val
    2345                 2350                  2355

Val Ser  Met Ile Ser Ile Thr  Ile Leu Lys Ser Asp  Asn Ser Ile
    2360                 2365                  2370

Ile Ser  Asp Ser Lys Ser Val  Ser Glu Phe Thr Phe  Thr Ile Lys
    2375                 2380                  2385

Asp Ile  Ala Phe Gly Val Gly  Phe Gly Val Leu Ile  Thr Phe Leu
    2390                 2395                  2400

Asn Ser  Leu His Ile Leu Leu  Cys Thr Lys Cys Arg  Ser His Ser
    2405                 2410                  2415

Glu His  Tyr Tyr Tyr Lys Lys  Arg Lys Arg Glu Asp  Pro Glu Phe
    2420                 2425                  2430

Lys Asp  Asn Ser Gly Ser Trp  Pro Met Phe Met Ala  Gly Met Ala
    2435                 2440                  2445

Arg Thr  Ile Ile Val Phe Pro  Val Leu Met Gly Leu  Ile Tyr Ile
    2450                 2455                  2460

Ser Gly  Ala Gly Met Ser Leu  Met Asp Asp Leu Ala  Asn Ser Phe
    2465                 2470                  2475
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Tyr Ile  Arg Phe Leu Ile Ser  Leu Ile Leu Trp Ala  Val Val Phe
    2480             2485         2490

Glu Pro  Ile Lys Gly Leu Ile  Trp Ala Phe Leu Ile  Leu Lys Thr
    2495             2500         2505

Arg Lys  Ser His Lys Ile Ile  Asn Lys Leu Glu Gly  Ser Asp Gly
    2510             2515         2520

Thr Val  Val Lys Tyr Tyr Glu  Met Leu Tyr Ile Phe  Phe Ser Val
    2525             2530         2535

Leu Ile  Phe Val Lys Glu Ile  Val Phe Tyr Leu Tyr  Gly Arg Tyr
    2540             2545         2550

Lys Val  Ile Thr Thr Met Lys  Pro Thr Arg Asn Pro  Phe Lys Ile
    2555             2560         2565

Val Tyr  Gln Leu Ala Leu Gly  Asn Phe Ser Pro Trp  Asn Phe Met
    2570             2575         2580

Asp Leu  Ile Val Gly Ala Leu  Ala Val Ala Ser Val  Leu Ala Tyr
    2585             2590         2595

Thr Ile  Arg Gln Arg Thr Thr  Asn Arg Ala Met Glu  Asp Phe Asn
    2600             2605         2610

Ala Asn  Asn Gly Asn Ser Tyr  Ile Asn Leu Thr Glu  Gln Arg Asn
    2615             2620         2625

Trp Glu  Ile Val Phe Ser Tyr  Cys Leu Ala Gly Ala  Val Phe Phe
    2630             2635         2640

Thr Ser  Cys Lys Met Ile Arg  Ile Leu Arg Phe Asn  Arg Arg Ile
    2645             2650         2655

Gly Val  Leu Ala Ala Thr Leu  Asp Asn Ala Leu Gly  Ala Ile Val
    2660             2665         2670

Ser Phe  Gly Ile Ala Phe Leu  Phe Phe Ser Met Thr  Phe Asn Ser
    2675             2680         2685

Val Leu  Tyr Ala Val Leu Gly  Asn Lys Met Gly Gly  Tyr Arg Ser
    2690             2695         2700

Leu Met  Ala Thr Phe Gln Thr  Ala Leu Ala Gly Met  Leu Gly Lys
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2705   2710   2715

Leu Asp Val Thr Ser Ile Gln Pro Ile Ser Gln Phe Ala Phe Val
    2720   2725   2730

Val Ile Met Leu Tyr Met Ile Ala Gly Ser Lys Leu Val Leu Gln
    2735   2740   2745

Leu Tyr Val Thr Ile Ile Met Phe Glu Phe Glu Glu Ile Arg Asn
    2750   2755   2760

Asp Ser Glu Lys Gln Thr Asn Asp Tyr Glu Ile Ile Asp His Ile
    2765   2770   2775

Lys Tyr Lys Thr Lys Arg Arg Leu Gly Leu Leu Glu Pro Lys Asp
    2780   2785   2790

Phe Ala Pro Val Ser Ile Ala Asp Thr Gln Lys Asp Phe Arg Leu
    2795   2800   2805

Phe His Ser Ala Val Ala Lys Val Asn Leu Leu His His Arg Ala
    2810   2815   2820

Thr Arg Met Leu Gln Thr Gln Gly Gln Tyr Gln Asn Gln Thr Val
    2825   2830   2835

Ile Asn Tyr Thr Leu Ser Tyr Asp Pro Val Ser Ala Ile His Glu
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Thr Gly Pro Lys Arg Phe Gln Lys Trp Arg Leu Asn Asp Val Glu
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Lys Asp
    2870

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<211> 200
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Pro Phe Glu Glu Gly His Thr Leu Trp Met Lys Arg Glu Lys Ile Lys
            20   25   30

His Leu Gln Arg Ile Leu Gln Phe His Ser Asp Glu Ser Ile Leu Met
     35   40   45

Ile Asp Lys Lys Leu Met Ile Ser Gly Gly Leu Glu Pro Pro Thr Phe
     50   55   60

Cys Val Leu Asp Arg Cys Asp Asn His Tyr Thr Thr Lys Pro Arg His
65   70   75   80

Leu Pro Pro Phe Glu Val Phe Leu Phe Val Val Ile Phe Lys Cys Glu
          85   90   95

Pro Ser Ser Met Asn Tyr Gly Ala Ala Asp Glu Arg Trp Ala Asn Pro
         100   105   110

Pro Gln Pro Val Ala Ala Ala Glu His Gly Pro Ser Phe Asp His Ser
        115   120   125

Met Val Ser Glu Glu Tyr Glu His Asp Lys Lys Lys Asn Pro Ala Gln
     130   135   140

Lys Glu Gly Ile Ser Phe Ser Gln Ala Leu Leu Ala Ser Gly His Glu
145   150   155   160

Lys Ser Asp Gly Lys Ile Lys Leu Thr Ala Arg Ser Phe Met Glu Val
         165   170   175

Gly Gly Tyr Ala Val Phe Leu Ile Val Leu Val Tyr Asp Ser Ser Thr
         180   185   190

Pro Arg Gln Lys Ser Leu Lys Thr
         195   200